Upper Dean Channel Salmon Test Fishery, 1984

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August, 1985

Canadian Manuscript Report of Fisheries and Aquatic Sciences No. 1838

85-5884/

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Cat. No. FS 97-4/1838 ISSN 0706-6473

Correct citation for this publication:
Orman, Lynda. 1985. Upper Dean Channel salmon test fishery, 1984. Can. MS Rep. Fish. Aquat. Sci. 1838: 34 p.

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ABSTRACT

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A gillnet test fishery was initiated in 1984 in the Upper Dean Channel area of the Department of Fisheries and Oceans (DFO) Statistical Area 8 to monitor the escapement of sockeye and chum salmon destined primarily for the Kimsquit River. Information collected included site monitoring, mean daily catch per hour of dominant salmon species, run timing data, and length, age and sex biosamples. Sockeye abundance peaked in the terminal spawning area on July 19 and 29; pink and chum salmon abundance peaked July 4, 30 and August 15 respectively. The dominant sockeye age classes were age 4_2 (50%) and 5_2 (49%); these exhibited mean lengths of 456 mm and 461 mm respectively, and an overall sex ratio of 1.3:1 males/females. Chum salmon were primarily age 4_2 (58%) with a mean length of 614 mm and an observed sex ratio of 1.1:1 males/females. Improvements to the test fishery are suggested, along with a means of quantifying spawners with reference to the gillnet abundance index.

Key words: Upper Dean Channel, Kimsquit River, 1984 gillnet test fishery, sockeye and chum salmon.

RÉSUMÉ

Orman, Lynda. 1985. Upper Dean Channel salmon test fishery, 1984. Can. MS Rep. Fish. Aquat. Sci. 1838: 34 p.

En 1984, on a lancé une pêche expérimentale au filet maillant dans la partie supérieure du chenal Dean, dans la zone statistique 8 du ministère des Pêches et des Océans (MPO), en vue d'étudier la remontée des saumons rouge et kéta se dirigeant principalement vers la rivière Kimsquit. On a ainsi recueilli des données sur le contrôle des points de capture, les prises quotidiennes moyennes des principales espèces capturées par heure, le moment de la remonte, la longueur, l'âge et le sexe. Dans la frayère terminale, le nombre de saumons rouges a atteint son maximum les 19 et 29 juillet tandis que les saumons roses et kétas étaient respectivement plus nombreux les 4 et 40 juillet, et le 15 août. Les plus importantes classes de saumon rouge étaient âgées de 4_2 (50%) et de 5_2 (49%) ans et avaient unelongueur moyenne respective de 456 mm et de 461 mm; la proportion relative des sexes s'élevait à 1,3 mâle: 1 femelle. En général, les saumons kétas étaient âgés de 4_2 ans (58%) et mesuraient 614 mm en moyenne; la proportionrelative des sexes observée s'élevait à 1,1 mâle: 1 femelle. On propose des améliorations à la pêche expérimentale et un moyen de quantification desgéniteurs par rapport à l'indice d'abondance des poissons capturés au filetmaillant.

Mots-clés: partie supérieure du chenal Dean, rivière Kimsquit, pêche expérimentale au filet maillant en 1984, saumons rouge et kéta.

INTRODUCTION

During the 1984 summer season for salmon, a gillnet test fishery was initiated in the Upper Dean Channel area, management units (M.U.) 8-8 and 8-9 in Statistical Area 8, to monitor the abundance of sockeye and chum salmon destined primarily for the Kimsquit River (Figs. 1-3). The test fishery was implemented due to difficulties in assessing stock abundance in the past, lack of quantitative data with which to support the Department of Fisheries and Oceans (DFO) management decisions, and uncertainty in escapement estimates for the deep, glacial waters of the Kimsquit River and Kimsquit Lake spawning areas. Improvement in stock assessment and the suggestion for a test fishery were tabled at a workshop on Bella Coola (Area 8) fisheries management held in Prince Rupert (January, 1984). This suggestion, however, was not priorized on a list of recommendations resulting from the workshop (Radford 1984). Although the magnitude of sockeye and chum stocks spawning in this area is low to moderate, numbering around 50,000 for the two species combined (10,000 sockeye, 40,000 chum, 1984 data), their contribution to commercial fisheries accounts for an estimated 40% of the total Area 8 salmon fishery, or in the order of 80,000 pieces in recent years (1979-83 data). More accurate stock assessment through test fishing may be vital for improving fisheries management and for rebuilding stocks over the long term. The purpose of the Upper Dean Channel gillnet test fishery in 1984 was to provide a more consistent indicator of stock abundance which could be developed and used over the longer term in place of the commercial fishery catch per unit effort (CPUE) data and the highly variable stream escapement data from foot surveys.

DESCRIPTION OF STUDY AREA

Upper Dean Channel is a north north-eastern extension of Dean and Fisher Channels which drain southerly into Fitz Hugh Sound and Queen Charlotte Sound, a body of water just north of Vancouver Island (Figs. 1-3). The Kimsquit River lies 63 km north north-west from Bella Coola, a coastal community in central British Columbia (Fig. 3). This river drains an area of 975 km^2 with headwaters originating in the glaciers of the Quonyalla Range of the Coastal Mountains, approximately 60 km from the coast. The river itself drains southerly into the Upper Dean Channel, a narrow fjord which lies approximately 220 km from the open Pacific waters of Queen Charlotte Sound.

DESCRIPTION OF SALMONID RESOURCE

Although all five species of Pacific salmon, as well as steelhead trout (Salmo gairdneri), spawn in the Upper Dean Channel streams, description of the status of stocks will be limited to sockeye (Oncorhynchus nerka) and chum salmon (Oncorhynchus keta). Some of this information as well as that pertaining to other species was taken from the Salmon Resource Management Plan (DFO 1985).

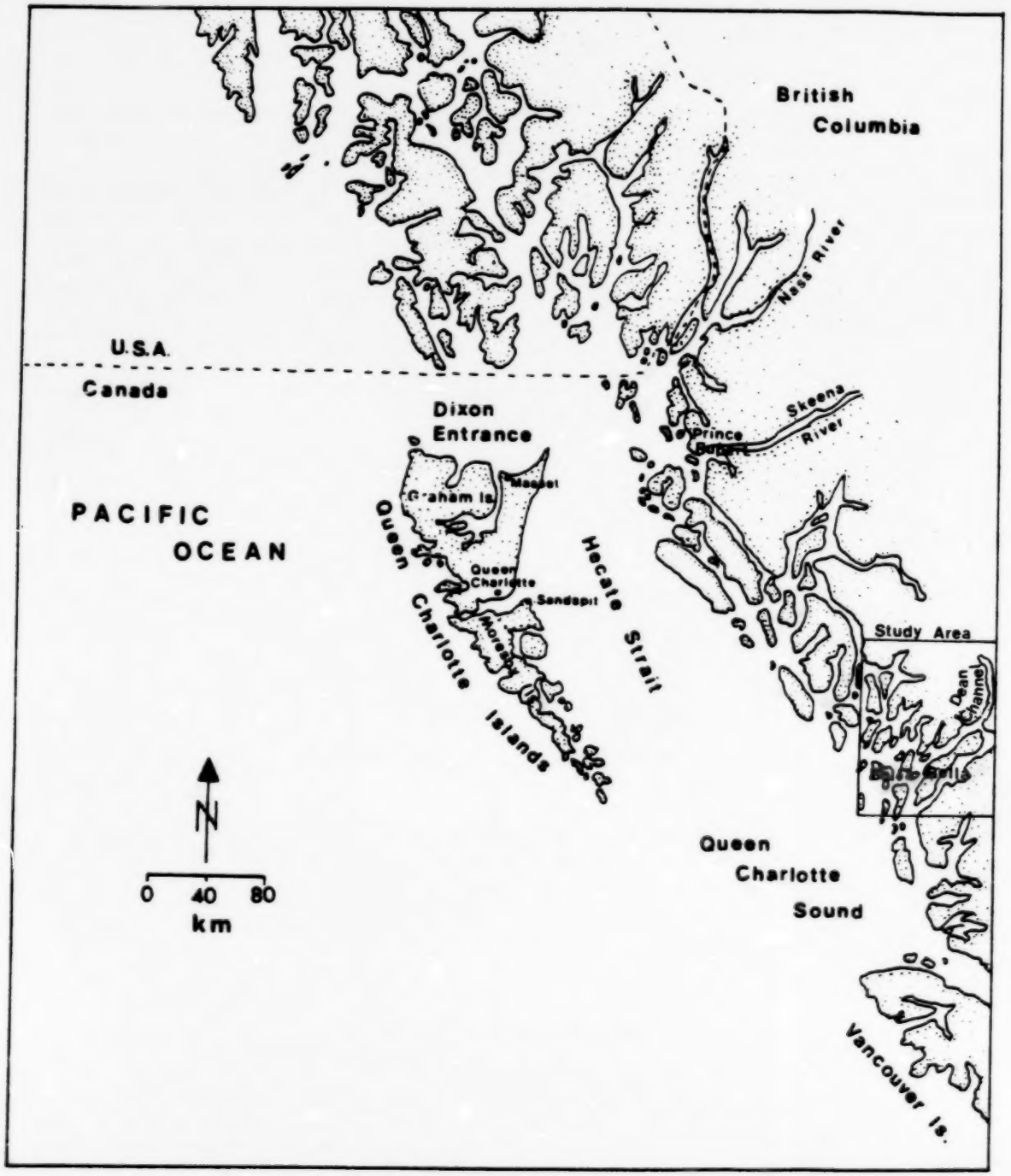

Fig. 1. Geographic location of the Dean Channel study area.

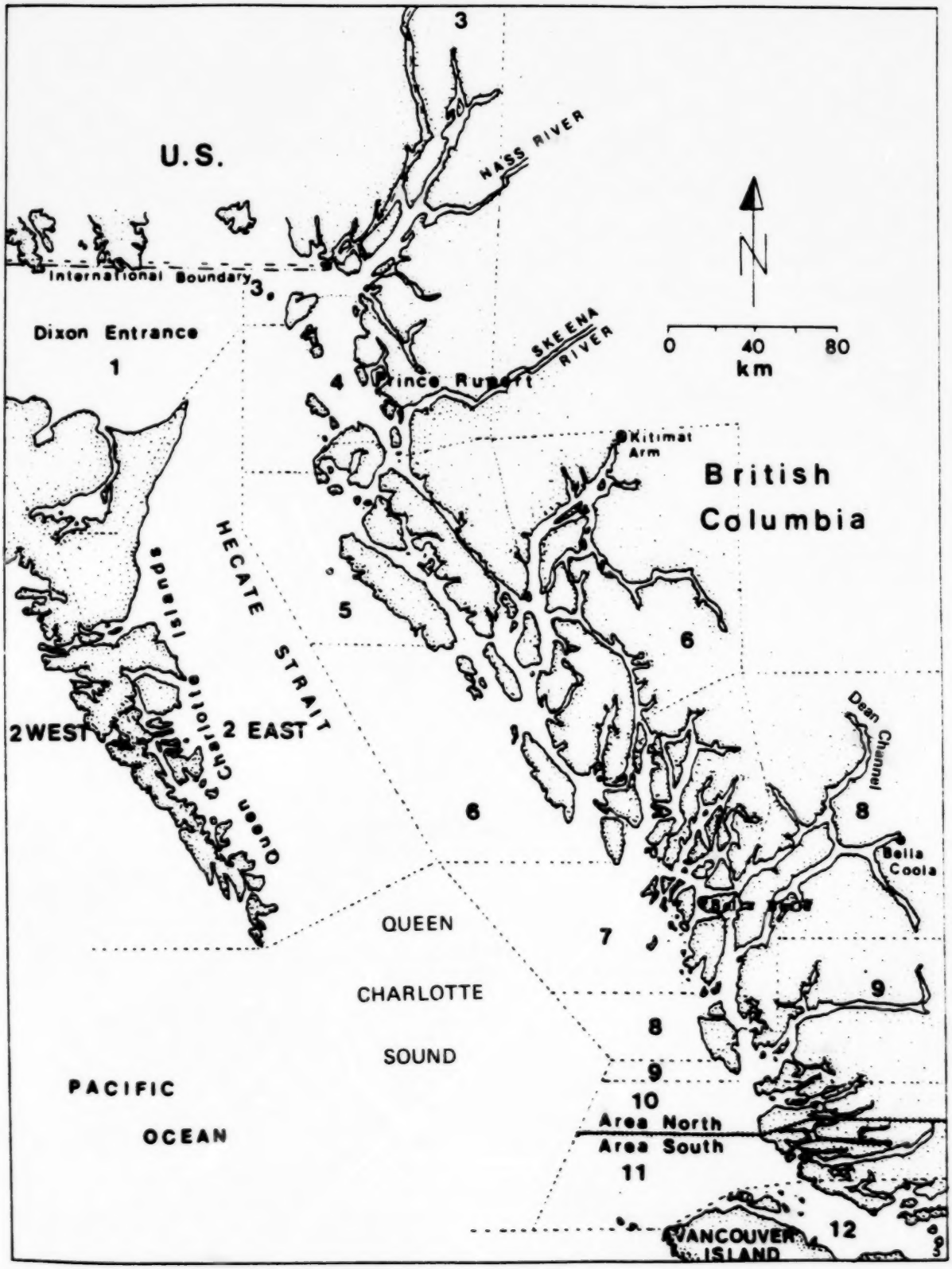

Fig. 2. Location of Statistical Areas in northern B.C.

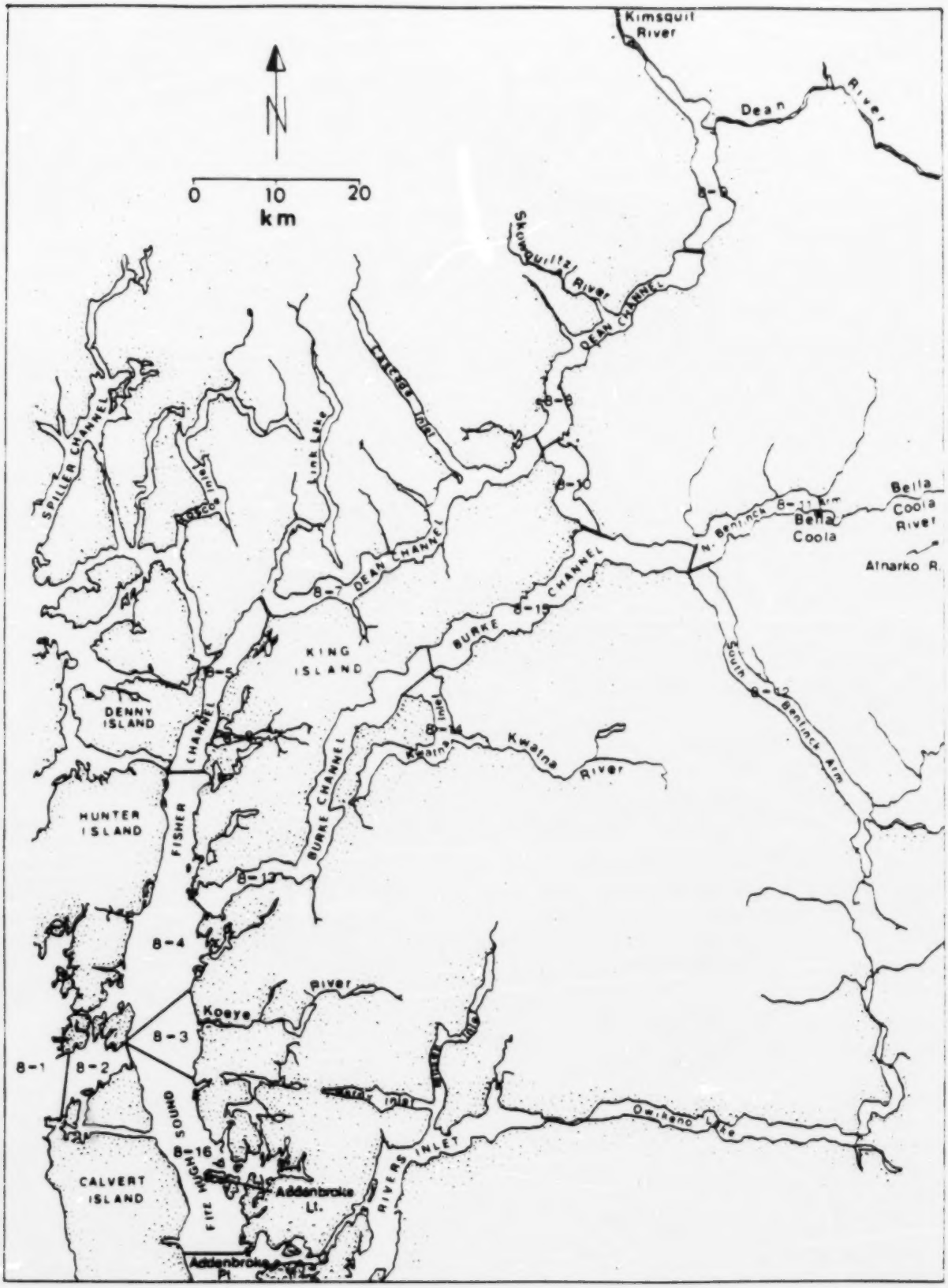

Fig. 3. Area 8 study area detailing geographic features referred to in text.

SOCKEYE

There are two sockeye stocks in the Upper Dean Channel area. The actively managed Kimsquit sockeye comprise over 95% of the Upper Dean Channel sockeye escapement and account for just over 15% of the total Area 8 sockeye spawners, being surpassed by the more numerous North Bentinck Arm sockeye (Bella Coola River, Fig. 3). Average escapement levels by decade during the 1950-83 period ranged from a low of approximately 7,500 in the 1950's to a high of approximately 35,000 during the 1970's. The previous 10-year average (1974-83) was just under 15,000 sockeye spawners, although the 1983 spawning escapement increased to the 30,000 optimum.

The passively managed Dean sockeye comprise a very minor and severely depressed stock (DFO 1985). The previous 10-year average (1974-83) escapement level was less than 600 fish which is only 40% of the 1,500 escapement optimum.

The Upper Dean Channel sockeye, notably the Kimsquit River stock, are believed to migrate up the Burke and Labouchere Channels as well as up the Fisher and Dean Channels, ie. on either side of King Island (Fig. 3) (DFO 1985). Further north and westward, a portion of the stock passes through Area 7 waters (Fig. 2) where it is subjected to commercial harvest prior to approaching its natal stream via Fitz Hugh Sound (Starr et al. 1984).

CHUM

There are five chum salmon stocks in the Upper Dean Channel. The actively managed Kimsquit chum comprise 90% of the Upper Dean Channel chum escapement and account for just over 30% of the total Area 8 chum spawners, being surpassed by the more numerous North Bentinck Arm chum (Bella Coola River). Average escapement levels by decade during the 1950-83 period ranged from a low of approximately 45,000 in the 1950's to a high of approximately 52,000 in the 1960's. The previous 10-year average (1974-83) was depressed at below 38,000 spawners. However, the 1983 spawning escapement increased to nearly 56,000, indicating that the stock may be rebuilding towards a target escapement of 60,000.

The four passively managed chum stocks assigned to this sub-area are very depressed and declining (DFO 1985). The previous 10-year average (1974-83) overall escapement level was less than 4,000 fish which is only 16% of the 25,100 escapement optimum. The 1983 total escapement for these chum stocks dropped to less than 1,000 salmon.

As with pink and sockeye, there is some evidence that the Upper Dean Channel chum stocks, notably the Kimsquit stock, migrate along both sides of King Island (DFO 1985). Charles and Henderson (1985) in their stock reconstructions of chum salmon for 1970 to 1982, defined four approach routes through which Kimsquit chum salmon migrated: Dean Channel, Fisher Channel and Fitz Hugh Sound, North Bentinck Arm, and through Area 7 in general (Figs. 2 and 3).

CURRENT MANAGEMENT

The following section reviews current fishery management in the Upper Dean Channel, Area 8, and is included here in order to provide some background information for the Upper Dean Channel gillnet test fishery.

The Upper Dean Channel gillnet area (M.U. 8-8) is one of three principal fishing areas in Area 8, the other two being the Fisher Channel/Fitz Hugh Sound seine and gillnet fisheries (M.U.'s 8-2, 8-3, 8-4 and 8-5) and the Bella Coola gillnet area (M.U.'s 8-10, and 8-15) (Fig. 3). The Upper Dean Channel is limited to gillnets targeting on sockeye, pink and chum salmon. Fishing for sockeye does not begin until the first week of July, when the area is opened to small mesh gillnets in conjunction with fisheries in the Fisher/Fitz Hugh and Bella Coola areas (DFO 1985). Catch and effort data are examined from this commercial "test" fishery in an attempt to assess stock strength early in the sockeye run (D. Peacock, DFO, pers. comm.). In theory, if CPUE is greater than that achieved in comparable weeks during years of optimal spawning, the fishery is extended in time or area. McGivney (MS 1984), however, demonstrated that the underlying relation between commercial fishery CPUE and fish abundance in a nearby inlet was compounded by several sources of error. In addition, the estimate of fish abundance being used was not appropriate because the total available stock was not vulnerable to the fishery. McGivney (MS 1984) concluded that CPUE data should be used cautiously in managing the fishery because of the high variability in results.

Problems in defining optimal spawning for Kimsquit sockeye and the uncertainty in visual estimation of spawners under the often high flow and glacial silt conditions of the Kimsquit River and Kimsquit Lake have made management of this area difficult. In addition, the proportion of Kimsquit sockeye contributing to Fisher/Fitz Hugh and Area 7 catch levels in various weeks is uncertain. For the 1970 to 1982 period, Starr, Charles and Henderson (1984) estimated mean Kimsquit sockeye catch proportions of 67% in the Dean Channel gillnet fishery, 23% in the outside net fisheries in Fisher/Fitz Hugh Sound area and 10% in the Area 7 fishery.

Sockeye scale data provide age composition of the catch and are incorporated into management considerations as they become available, usually by the second week in July (D. Peacock, DFO pers. comm.). Conservation practises may be enacted if the age composition data indicate a decline in dominant year sockeye, possibly as a result of poor brood year spawn, poor environmental conditions such as flooding, or increased natural mortality due to competition, predation or unfavourable oceanic factors.

By the third week of July, Kimsquit sockeye have peaked in the Dean Channel gillnet area and summer chum are intercepted in moderate numbers. Sockeye catches diminish by late July and early August as the fish escape to spawn, while the chum run builds. By mid-August, Kimsquit summer chum peak and the fisheries management decisions are dependent on the CPUE data from the previous week, as well as the target escapement estimates from foot surveys.

Charles and Henderson (1985) in their stock reconstructions of chum salmon for the 1970 to 1982 period, defined mean catch proportions in four fisheries in

which Kimsquit chum were believed to be harvested: Dean Channel gillnet fishery 40%, Fisher Channel and Fitz Hugh Sound seine and gillnet fisheries 30%, Bella Coola gillnet fishery 15%, and Area 7 net fishery 15%.

METHODS

A 10.5 m (34.5 ft) gillnet vessel was chartered in 1984 at the onset of the Kimsquit sockeye run to test-fish three or four days each week primarily for sockeye and chum salmon, at a standardized site in the Upper Dean Channel. Site selection was examined during the first two weeks of the test fishery to appraise catchability, uni-directional (north-westward) movement of fish and gillnetting feasibility. A site was bypassed if there appeared to be a two-way movement of fish possibly indicating milling or holding of salmon, or if catchability was relatively poor, or if site testing indicated difficult fishing conditions (eg. tide rips, high exposure to winds, abundance of kelp, presence of shoals, and high concentration of predators such as seals or of non-target species such as steelhead, and dogfish).

The selected test fishing site was located approximately 2.2 km south of Manitoo Creek, on the more sheltered north-western side of a small point of land (Fig. 4). During the first week of the study, test sets were performed at three alternate sites. These were located at 1.6 km north of Swallop Creek, 0.6 km south of Raphoe Point, and approximately 0.4 km northwest of Humpback Creek (Fig. 4). The Manitoo Creek site was chosen as a standard fishing location mainly because it seemed to be a better indexing site for sockeye salmon (ie. slightly higher catchability), the incidental catch of steelhead was minimal (compared, for example, to Swallop Creek site where the steelhead bicatch was relatively high), good shelter was provided under variable fishing conditions, and the test fishing operation was easier logistically (required less travel time and fuel consumption).

Test sets were standardized with respect to tide and duration and were generally made in a consistent manner. Sampling times were approximately one hour in duration about the midpoint of slack water tides as listed in the local tide books (Appendix 1).

Fishing gear was standardized as much as possible throughout the test fishery. Two gillnets were maintained for each target species, sockeye and chum salmon. The paired nets had similar features such as mesh size, hang ratio, lead line weight and colour. Sockeye gillnet mesh sizes measured 11.75 cm (4 $^{5}/_{8}$ in) and 11.11 cm (4 $^{3}/_{8}$ in) on the diagonal, while the chum gillnet mesh sizes measured 16.51 cm (6 $^{1}/_{2}$ in) and 15.56 cm (6 $^{1}/_{8}$ in). The 11.75 cm sockeye net was an older net used just on the initial few sets as the skipper familiarized himself with the test sites. It was the skipper's responsibility to ensure that the fishing gear was properly maintained and that necessary net repairs were made routinely in order to provide consistent fishability. As the earlier sockeye run peaked and tapered off and the chum run began, the two different mesh-sized nets were used alternately from July 21 to August 1 to

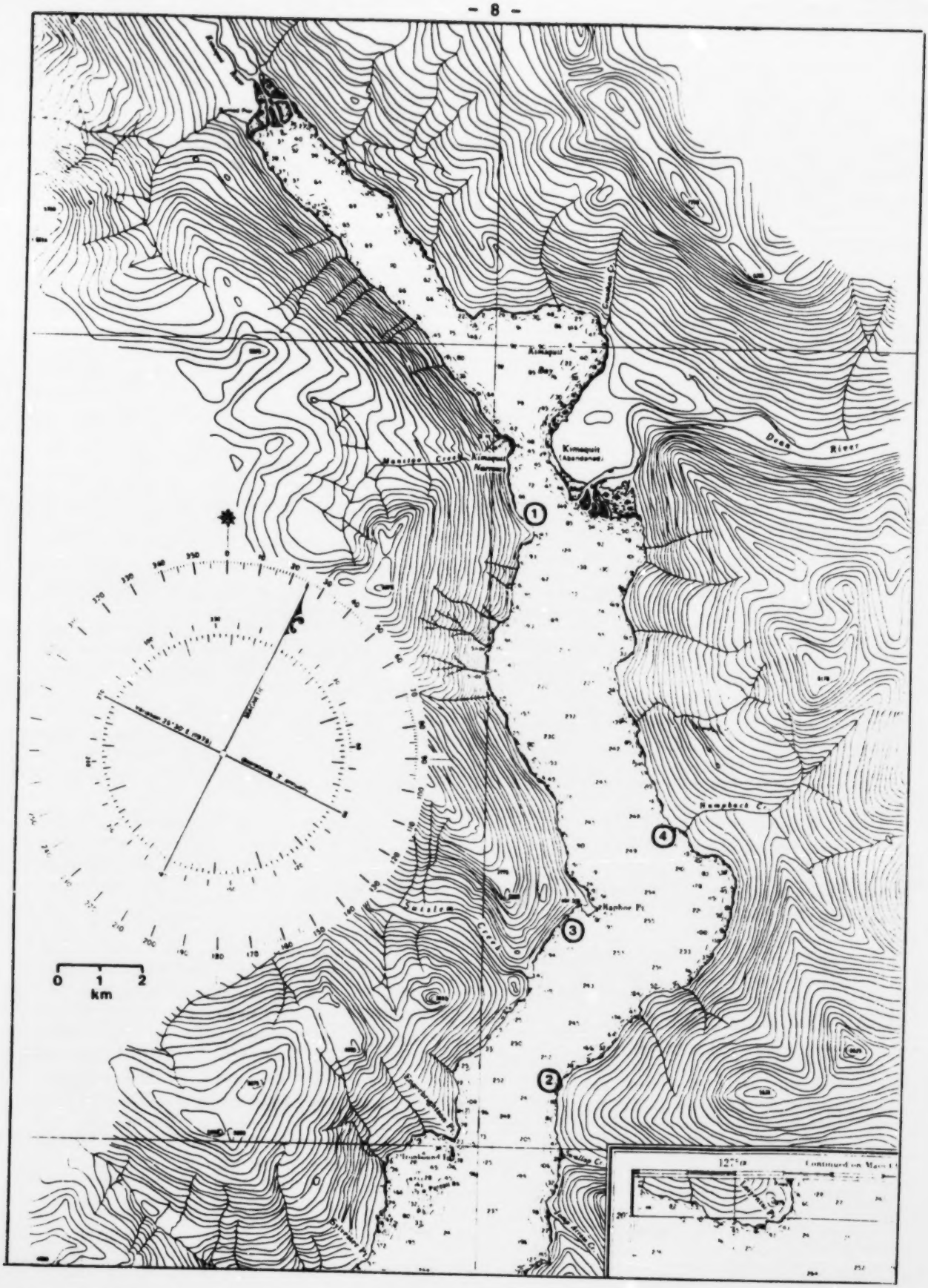

Fig. 4. Test fishing sites in Upper Dean Channel, 1984.

reflect the transition in species abundance. Gillnet and vessel specifications are detailed in Appendix 2.

The data on average daily catch per gillnet hour were supplemented with salmon biosampling data including age (scale analysis), sex and length measurements (postorbital-hypural). A random sample of 30 sockeye and 30 chum salmon was taken daily, when available, by a technician aboard the vessel. In addition, climatological data including sea surface temperature, wind and sky conditions were recorded.

Charter payment was made through the sale of fish. Payment fishing sets were made outside the study area, usually on alternate non-test fishing days.

RESULTS

In 1984, a total of 85 gillnet sets were made in the Upper Dean Channel during 24 days of test fishing from June 26 to August 22. Test catches totalled 877 sockeye and 951 chum salmon which were caught with mesh sizes designed to target on these species (Table 1). In addition, high numbers of pink salmon (748) were taken, although mesh sizes were not optimal for this species; substantially larger catches might have been anticipated with a smaller mesh size.

Incidental catches of steelhead, coho and chinook salmon amounted to 82, 24 and 21 fish respectively (Appendix 3). Dean River steelhead conservation concerns necessitated release of all viable steelhead throughout the test fishery. Species catch, set time, duration and location are recorded in Appendix 3. Additional information includes tidal state, net size, climatological data and incidence of seals. Mean daily catch per gillnet hour (CPGH) was calculated for sockeye, pink and chum salmon (Table 1).

GILLNET CATCH AND SPECIES RUN TIMING

Sockeye

The sockeye run extended from late June until the beginning of August (June 26 - August 2), exhibiting a bimodal run pattern with mean daily catch per hour peaking July 19 and July 29 at 40 and 38 sockeye respectively (Table 1). The percent of the total mean daily CPGH represented by each peak was 13%. The 50% point in cumulative mean daily CPGH occurred between July 15 and 19 (Table 1).

Pink

The high incidental catches of pink salmon indicated run initiation early in July (July 4) and continuation through late July; minor catches were recorded with the larger mesh size through mid-late August (Table 1). Peak abundance of pink salmon appeared to be trimodal, with the main peaks occurring on July 4 and

Table 1. Mean daily catch per hour for sockeye, pink and chum salmon at station 1 (Manitoo Creek), Upper Deep Channel gillnet test fishery, 1984.

T.F.[a] DATE	SET NUMBER	STATION[b] NUMBER	TIME SET (MEDIAN)	FISH TIME (MIN)	TIDE[c]	NET[d] (CODED)	SPECIES CATCH			CATCH PER HOUR			AVERAGE DAILY CATCH PER HOUR[e]								
													SOCKEYE			PINK			CHUM		
							SOCKEYE	PINK	CHUM	SOCKEYE	PINK	CHUM	NO.	% TOTAL	CUM %	NO.	% TOTAL	CUM %	NO.	% TOTAL	CUM %
JUNE 26	1	1	513	57	LL	1	1			1.06			1.06	0.55	0.55	0.00					
JUNE 26	2	2	1116	99	LH	1															
JUNE 27	3	2	1712	72	HL	1		2			1.67										
JUNE 27	4	1	2223	66	HH	1	3			2.73			2.73	0.90	1.25	0.00					
JULY 1	5	1	215	64	HH	2	5	3		4.69	2.81										
JULY 1	6	1	858	70	LL	2	1		1	0.86		0.86	2.69	0.88	2.13	1.34	0.52	0.52	0.45	0.16	0.16
JULY 1	7	2	1527	72	LH	2	1	7		0.83	5.83										
JULY 2	8	2	2058	78	HL	2	5	4		3.85	3.08										
JULY 2	9	3	253	69	HH	2		1			0.87										
JULY 2	10	3	951	67	LL	2		4	1		3.58	0.90									
JULY 4	11	1	435	72	HH	2	14	53	1	11.67	44.17	0.83	11.67	3.84	5.96	44.17	17.04	17.56	0.83	0.29	0.45
JULY 4	12	2	1113	70	LL	2															
JULY 4	13	4	1717	101	LH	2															
JULY 5	14	1	2359	69	HL	2		2			1.74		0.00			1.74	0.67	18.23	0.00		
JULY 8	15	2	343	67	LL	2		2			1.79										
JULY 8	16	2	943	72	LH	2	9	9	1	7.50	7.50	0.83									
JULY 8	17	1	1517	75	HL	2	12	11	2	9.60	8.80	1.60	9.60	3.16	3.16	8.80	3.40	21.63	1.60	0.56	1.02
JULY 9	18	1	2133	72	HH	2	6	1	1	5.00	0.83	0.83									
JULY 9	19	1	444	72	LL	2	7	1		5.87	0.84										
JULY 9	20	1	1047	95	LH	2	62	36	5	39.16	22.74	5.16	18.87	6.20	9.36	9.56	3.69	25.32	1.51	0.55	1.55
JULY 9	21	2	1609	75	HL	2	7	7	2	5.60	5.60	1.60									
JULY 10	22	2	2233	67	HH	2		1			0.90										
JULY 14	23	1	133	80	HH	2	30	38	4	22.50	28.50	3.00									
JULY 14	24	1	818	81	LL	2	47	9	10	35.03	6.71	7.45									
JULY 14	25	1	1446	69	LH	2	21	3	5	18.39	2.63	4.38	25.68	8.44	17.80	13.10	5.06	30.37	4.98	1.76	3.31
JULY 15	26	1	2023	86	HL	2	54	61	3	37.67	42.56	2.09									
JULY 15	27	1	215	71	HH	2	5	6		4.23	5.07										
JULY 15	28	1	857	98	LL	2	63	47	4	38.57	28.78	2.45									
JULY 15	29	1	1531	82	LH	2	30	3		21.95	2.20		27.06	8.90	26.70	20.83	8.04	38.41	2.85	1.01	4.31
JULY 16	30	1	2058	72	HL	2	45	7	1	37.76	5.87	0.84	37.76	12.41	39.11	5.87	2.27	40.68	0.84	0.30	4.61
JULY 19	31	1	455	90	LH	2	94	25	2	65.02	16.76	1.54									
JULY 19	32	1	1123	69	LL	2	11	11		9.64	9.64		39.87	13.11	52.22	13.67	5.28	45.96	0.76	0.27	4.88
JULY 20	33	1	1752	70	HH	2	23	16	10	19.71	13.71	8.57	19.71	6.48	58.70	13.71	5.29	51.25	8.57	3.05	7.90
JULY 21	34	1	113	105	LL	2	77	106	12	44.21	60.86	6.89									
JULY 21	35	1	658	71	LH	2	15	1	8	12.68	0.85	6.76									

Table 1 (cont'd).

T.F.[a] DATE	SET NUMBER	STATION[b] NUMBER	TIME SET (MEDIAN)	FISH TIME (MIN)	TIDE[c]	NET[d] (CODED)	SPECIES CATCH			CATCH PER HOUR			AVERAGE DAILY CATCH PER HOUR[e]								
													SOCKEYE			PINK			CHUM		
							SOCKEYE	PINK	CHUM	SOCKEYE	PINK	CHUM	NO.	% TOTAL	CUM %	NO.	% TOTAL	CUM %	NO.	% TOTAL	CUM %
JULY 21	36	1	1234	66	LL	3	1	1	19	0.91	0.91	17.27	23.11	7.60	66.29	26.83	10.35	61.60	9.69	3.42	11.32
JULY 22	37	1	1928	65	HH	3	2	1	6	1.85	0.92	5.54									
JULY 22	38	1	208	68	LL	3	8	2	9	7.06	1.76	7.94									
JULY 22	39	1	807	82	LH	3	18	1	50	13.17	0.73	36.59									
JULY 22	40	1	1343	73	HL	2	26	14	6	21.37	11.51	4.93	11.25	3.70	69.99	3.75	1.45	63.05	14.79	5.22	16.54
JULY 23	41	1	318	80	LL	2	15	49	13	11.25	36.75	9.75									
JULY 23	42	1	933	68	LH	2	9	3	14	7.94	2.65	12.35									
JULY 23	43	1	1437	71	HL	2	1	4	3	0.85	3.40	2.55	6.86	2.26	72.25	15.38	5.93	68.98	8.24	2.91	19.45
JULY 24	44	1	2112	66	HH	3	4		8	3.64		7.27	3.64	1.20	75.45	0.00			7.27	2.57	22.02
JULY 26	45	1	548	64	LL	3	1		21	0.94		19.69									
JULY 26	46	1	1218	80	LH	3	1		10	0.75		7.50	0.83	0.27	73.72	0.00			12.92	4.56	26.57
JULY 27	47	1	1748	78	HL	3	1	1	8	0.77	0.77	6.15									
JULY 27	48	1	2333	90	HH	2	6	35	5	4.00	23.33	2.00	2.50	0.82	74.54	12.86	4.96	73.95	3.93	1.39	27.96
JULY 28	49	1	28	79	HH	2	17	23	3	12.99	17.58	2.29									
JULY 28	50	1	718	71	LL	2	8	19	11	6.76	16.06	9.30									
JULY 28	51	1	1343	70	LH	3	11		18	9.43		15.43	9.84	3.24	77.78	11.48	4.43	78.38	8.75	3.09	31.05
JULY 29	52	1	1915	65	HL	3	1		7	0.92		6.46									
JULY 29	53	1	118	72	HH	3		1	3		0.83	2.50									
JULY 29	54	1	808	73	LL	3			16			13.15									
JULY 29	55	1	1423	77	LH	2	34	30	8	26.49	23.38	6.23	7.50	2.47	80.24	6.48	2.50	80.88	7.11	2.51	33.56
JULY 30	56	1	2003	83	HL	2	53	58	11	38.51	41.93	7.95	8.31	12.60	92.84	41.93	16.18	97.06	7.95	2.81	36.36
AUG 1	57	1	339	67	HH	2	4	3	2	3.58	2.69	1.79									
AUG 1	58	1	1003	66	LL	2	5	5	9	4.55	4.55	8.18									
AUG 1	59	1	1633	71	LH	3			38			32.11	2.65	0.87	93.71	2.35	0.91	97.97	14.41	5.09	41.45
AUG 2	60	1	2248	68	HL	3			6			5.29									
AUG 2	61	1	438	68	LH	3			16			14.12									
AUG 2	62	1	1058	68	HL	3	2	2	21	1.76	1.76	18.53	0.59	0.19	93.90	0.59	0.23	98.19	12.65	4.46	45.91
AUG 8	63	1	533	75	LL	3			10			8.00									
AUG 8	64	1	1159	71	LH	3			6			5.11	0.00			0.00			6.60	2.33	48.24
AUG 9	65	1	1714	79	HL	3		1	49		0.76	37.22									
AUG 9	66	1	2314	74	HH	3			34			27.76									
AUG 9	67	1	615	60	LL	3		1	20		1.01	20.17									
AUG 9	68	1	1253	67	LH	3		2	10		1.79	8.96	0.00			0.86	0.33	98.52	24.30	8.58	56.82
AUG 10	69	1	1814	69	HL	3	1		22	0.87		19.13									
AUG 10	70	1	3	77	HH	3		2	25		1.56	19.48	0.41	0.14	94.04	0.82	0.32	98.84	19.32	6.82	63.63

Table 1 (cont'd).

T.F.[a] DATE	SET NUMBER	STATION[b] NUMBER	TIME SET (MEDIAN)	FISH TIME (MIN)	TIDE[c]	NET[d] (CODED)	SPECIES CATCH SOCKEYE	SPECIES CATCH PINK	SPECIES CATCH CHUM	CATCH PER HOUR SOCKEYE	CATCH PER HOUR PINK	CATCH PER HOUR CHUM	AVERAGE DAILY CATCH PER HOUR[e] SOCKEYE NO.	SOCKEYE % TOTAL	SOCKEYE CUM %	PINK NO.	PINK % TOTAL	PINK CUM %	CHUM NO.	CHUM % TOTAL	CHUM CUM %
AUG 15	71	1	308	72	HH	4			26			21.67									
AUG 15	72	1	938	80	LL	4			62			46.50									
AUG 15	75	1	1555	67	LH	4			9			8.06									
AUG 16	74	1	2203	67	HL	4		1	13		0.90	11.64				0.00			26.58	9.38	73.01
AUG 16	75	1	348	70	LH	4		3	21		2.59	18.13									
AUG 16	76	1	953	72	LL	4		2	17		1.67	14.17									
AUG 16	77	1	1624	72	HH	4			28			23.50									
AUG 17	78	1	2233	67	HL	4			21			18.81				1.29	0.50	99.34	16.95	5.97	78.99
AUG 21	79	1	223	75	LL	4		2	25		1.61	20.13				0.00			18.81	6.64	85.62
AUG 21	80	1	858	82	LH	4		1	47		0.73	34.39									
AUG 21	81	1	1358	70	HL	4		1	24		0.86	20.57				1.06	0.41	99.75	25.43	8.98	94.60
AUG 22	82	1	2023	70	HH	4		1	11		0.86	9.50									
AUG 22	83	1	344	72	LL	4		1	18		0.84	15.10									
AUG 22	84	1	1028	70	LH	4			34			29.35									
AUG 22	85	1	1529	64	HL	4		1	7		0.94	6.56				0.66	0.25	100.00	15.30	5.40	100.00
TOTAL							877	748	951				304.19			259.13			283.35		

[a] TEST FISHING DATE: DATE STARTS AT 1701 HRS ON DAY "T" AND ENDS AT 1700 HRS ON DAY "T+1"

[b] STATION NUMBER: 1 = INSIDE POINT 2.2 KM SOUTH OF MANITOO CREEK
2 = 1.6 KM NORTH OF SWALLOP CREEK
3 = 0.6 KM SOUTH OF RAPHOE POINT
4 = POINT IMMEDIATELY NORTHWEST OF HUMPBACK CREEK

[c] TIDE: SLACK WATER TIDES; 1 HOUR LATER THAN TIDES LISTED ON BELLA BELLA TIDETABLE

[d] NET: 1 = 4 5/8" MESH, 500 FM WEB, 200 FM LONG
2 = 4 3/8" MESH, 550 FM WEB, 200 FM LONG
3 = 6 1/2" MESH, 500 FM WEB, 200 FM LONG
4 = 6 1/8" MESH

[e] AVERAGE DAILY CATCH PER HOUR: FOR SOCKEYE, PINK, CHUM SALMON CAUGHT AT SITE 1, INSIDE POINT 2.2 KM SOUTH OF MANITOO CREEK

July 30; an additional peak was apparent on July 22. The percent of the total mean daily CPGH represented by the three peaks was 17% (44 pinks), 16% (42 pinks) and 10% (27 pinks), respectively. The 50% point in cumulative mean daily CPGH occurred on July 20 (Table 1). A more size selective gillnet mesh may have yielded higher daily CPGH's and slightly different peak dates.

Chum

The chum salmon run began by mid-July (July 14) and extended through late August. The run was still continuing when test fishing terminated on August 22. Peak chum abundance was sustained throughout mid-August, with specific high mean daily CPGH's occurring on August 9 (24 chum), August 15 (27 chum) and August 21 (25 chum). The percent of the total mean daily CPGH represented by peak days was approximately 9% (Table 1). The 50% point in cumulative mean daily CPGH occurred on August 8.

SPAWNER CHARACTERISTICS

Biosamples of test-caught sockeye and chum salmon yielded the following information.

Sockeye

An overall male to female sex ratio of 1.32:1 was observed for sockeye during the test fishery. Weekly data indicated a higher percentage of females during the first week of the run (July 1-7, 57% females; Fig. 5, Table 2).

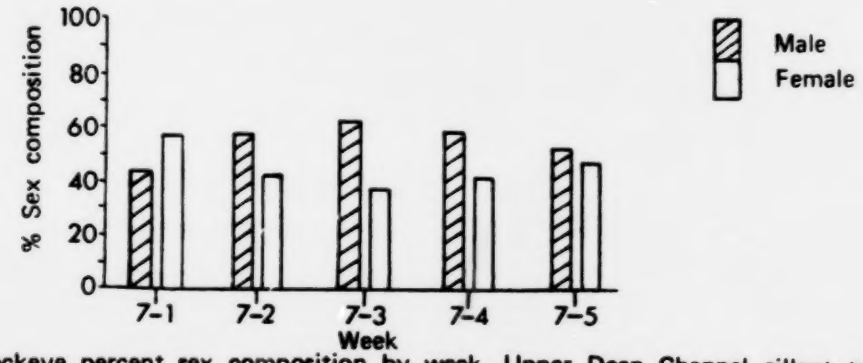

Fig. 5. Sockeye percent sex composition by week, Upper Dean Channel gillnet test fishery, July 1 - August 4, 1984.

Table 2. Sockeye sex composition by week, Upper Dean Channel gillnet test fishery, 1984. July 1 - August 4, 1984.

WEEK	TOTAL NO.	MALE NO.	MALE %	FEMALE NO.	FEMALE %
7-1	28	12	43	16	57
7-2	80	46	57.5	34	42.5
7-3	73	46	63	27	37
7-4	88	52	59	36	41
7-5	56	29	52	27	48
TOTAL	325	185	57%	140	43%

Sockeye age composition consisted of ages 4_2, 5_3 and 6_3 and was dominated by the age 4 (50%) and age 5 (49%) classes (Fig. 6, Table 3). Hypural length averaged 448 mm (range 370 mm - 510 mm) for females and 468 mm (range 380 mm - 580 mm) for males (Fig. 7, Table 4). Figure 8 shows the weekly mean hypural lengths by age and sex for sockeye. While age 6 sockeye could be discriminated by length (525 $\pm$ 21 mm SD, only male data available) age 4 and 5 sockeye lengths overlapped (Fig. 8, Tables 5 and 6). Overall percent age composition of sockeye with respective mean hypural lengths and sex ratios are presented in Figure 9 and Table 6. Figure 10 shows the overall length frequencies by age and sex for sockeye.

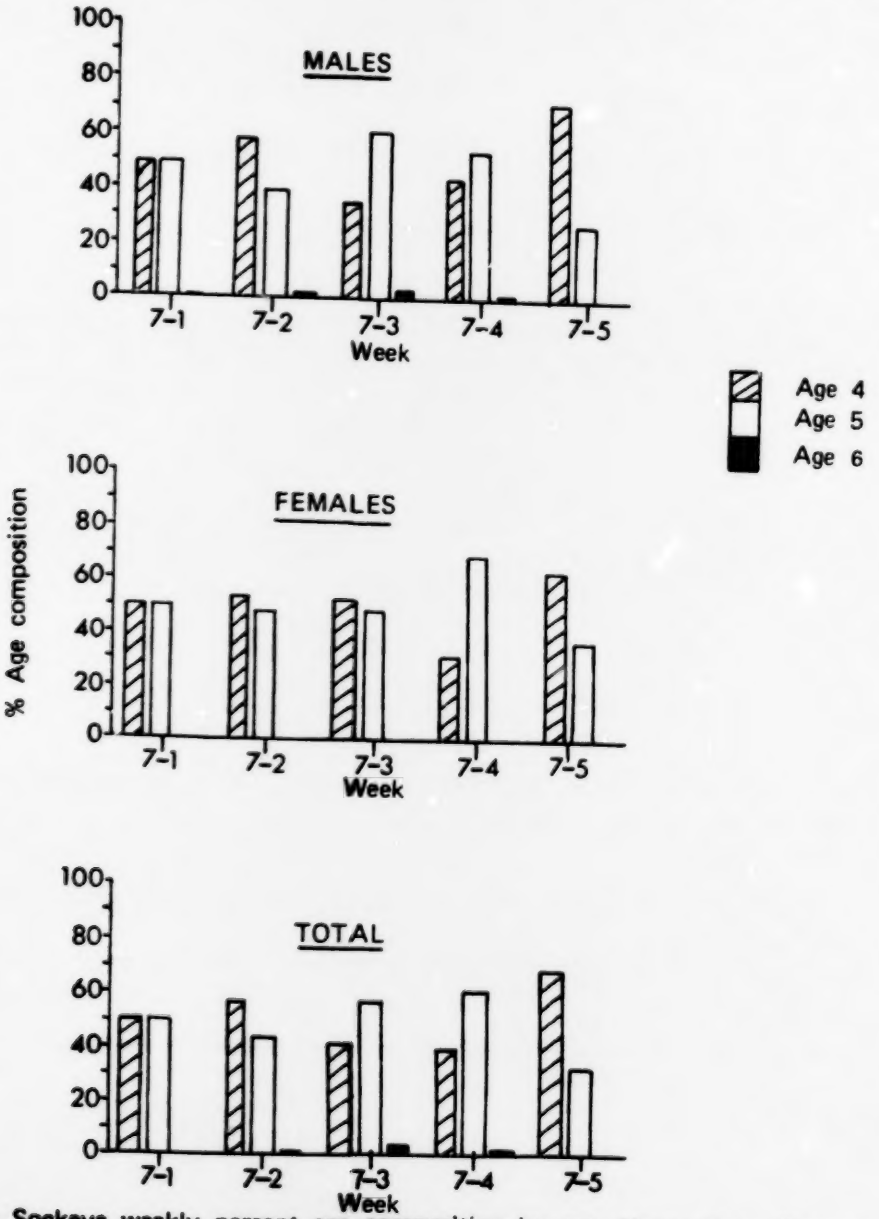

Fig. 6. Sockeye weekly percent age composition by sex, Upper Dean Channel gillnet test fishery, July 1 - August 4, 1984.

Table 3. Sockeye weekly percent age composition, Upper Dean Channel gillnet test fishery, July 1 - August 4, 1984.

WEEK	TOTAL NO.	AGE 4		AGE 5		AGE 6	
		NO.	%	NO.	%	NO.	%
7-1	28	14	50	14	50	0	0
7-2	80	45	56	34	43	1	1
7-3	73	30	41	41	56	2	3
7-4	88	34	39	53	60	1	1
7-5	56	38	68	18	32	0	0
TOTAL	325	161	50%	160	49%	4	1

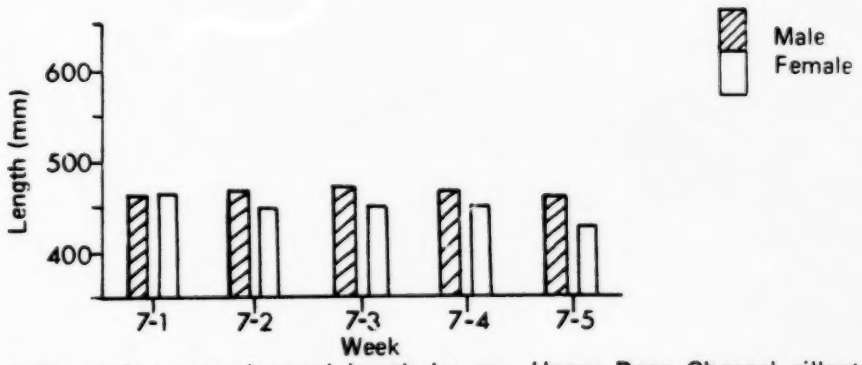

Fig. 7. Sockeye weekly mean hypural length by sex, Upper Dean Channel gillnet test fishery, July 1 - August 4, 1984 (ages combined).

Table 4. Sockeye weekly mean hypural length by sex, Upper Dean Channel gillnet test fishery, July 1 - August 4, 1984.

WEEK	TOTAL NO.	MALE		FEMALE		OVERALL
		MEAN (mm)	RANGE (mm)	MEAN (mm)	RANGE (mm)	MEAN (mm)
7-1	28	465	400-580	466	370-510	466
7-2	80	468	380-530	449	400-490	460
7-3	73	472	420-550	452	400-480	465
7-4	88	467	400-510	451	410-480	460
7-5	56	461	430-500	428	390-470	445
TOTAL	325	468	380-560	448	370-510	459

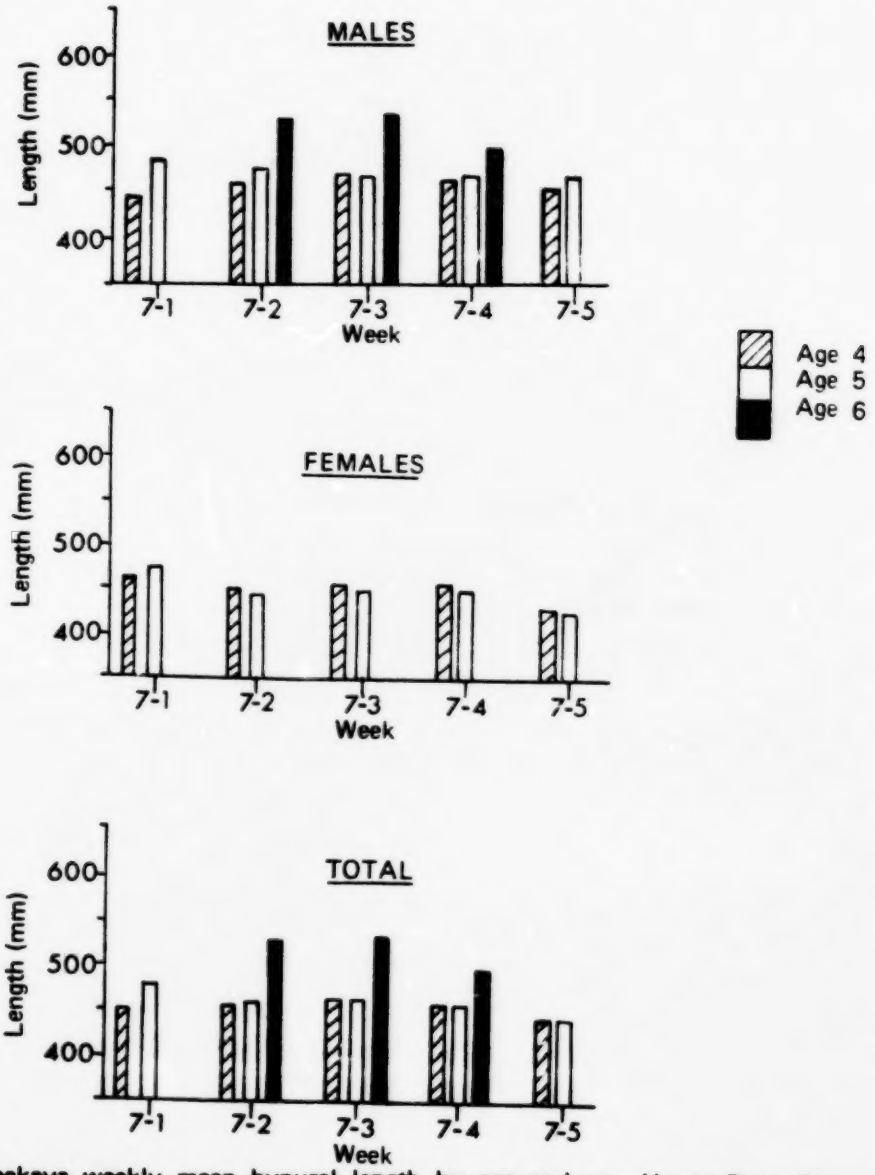

Fig. 8. Sockeye weekly mean hypural length by age and sex, Upper Dean Channel gillnet test fishery, July 1 - August 4, 1984.

Table 5. Sockeye length frequency distribution by age and sex, Upper Dean Channel gillnet test fishery, July 1 - August 4, 1984.

HYPURAL LENGTH (MM)	AGE 4		AGE 5		AGE 6	
	MALE	FEMALE	MALE	FEMALE	MALE	FEMALE
350						
360						
370		1				
380	1					
390		2				
400	1	3	1	3		
410	3			3		
420	1	5	2	6		
430	4	8	3	8		
440	8	7	5	12		
450	13	15	10	14		
460	23	8	14	13		
470	14	9	15	7		
480	11	5	18	2		
490	9	4	4	1		
500	4		11	2	1	
510	1	1	1	1		
520			1		1	
530					1	
540			1			
550			1		1	
560						
570						
580			1			
590						
600						
610						
620						
630						
640						
650						
TOTAL	93	68	88	72	4	0

Table 6. Sockeye overall age composition with respective mean hypural lengths and sex ratios, Upper Dean Channel gillnet test fishery, July 1- August 4, 1984.

	4 YRS OLD		5 YRS OLD		6 YRS OLD		TOTAL	
NO.	161		160		4		325	
% AT AGE	50%		49%		1%		100%	
MEAN LENGTH (mm)	456		461		525		459	
	MALE	FEMALE	MALE	FEMALE	MALE	FEMALE	MALE	FEMALE
SEX RATIO BY AGE	1.37:1		1.23:1		4.00:1		1.32:1	
NO.	93	68	88	72	4	0	185	140
% OF TOTAL	29	21	27	22	1	0	57	43
% M:F BY AGE	58	42	55	45	100	0	57	43
MEAN LENGTH BY AGE (mm)	461	449	472	447	525	0	468	448
STD. DEV. (mm)	23	27	27	23	21	0		

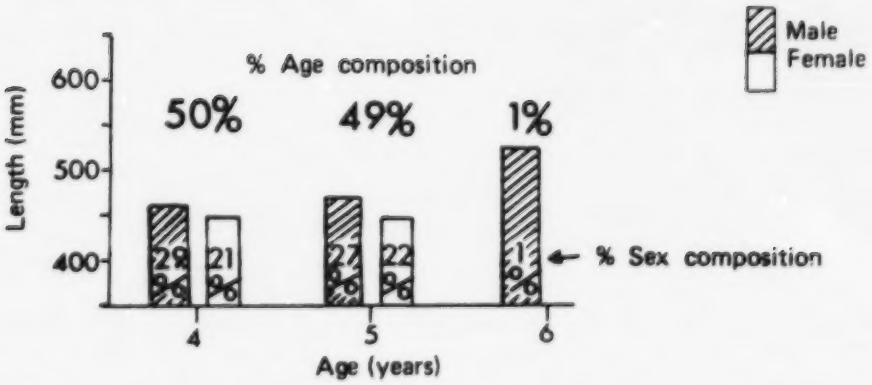

Fig. 9. Sockeye overall percent age composition with respective mean hypural lengths and sex ratios, Upper Dean Channel gillnet test fishery, July 1 - August 4, 1984.

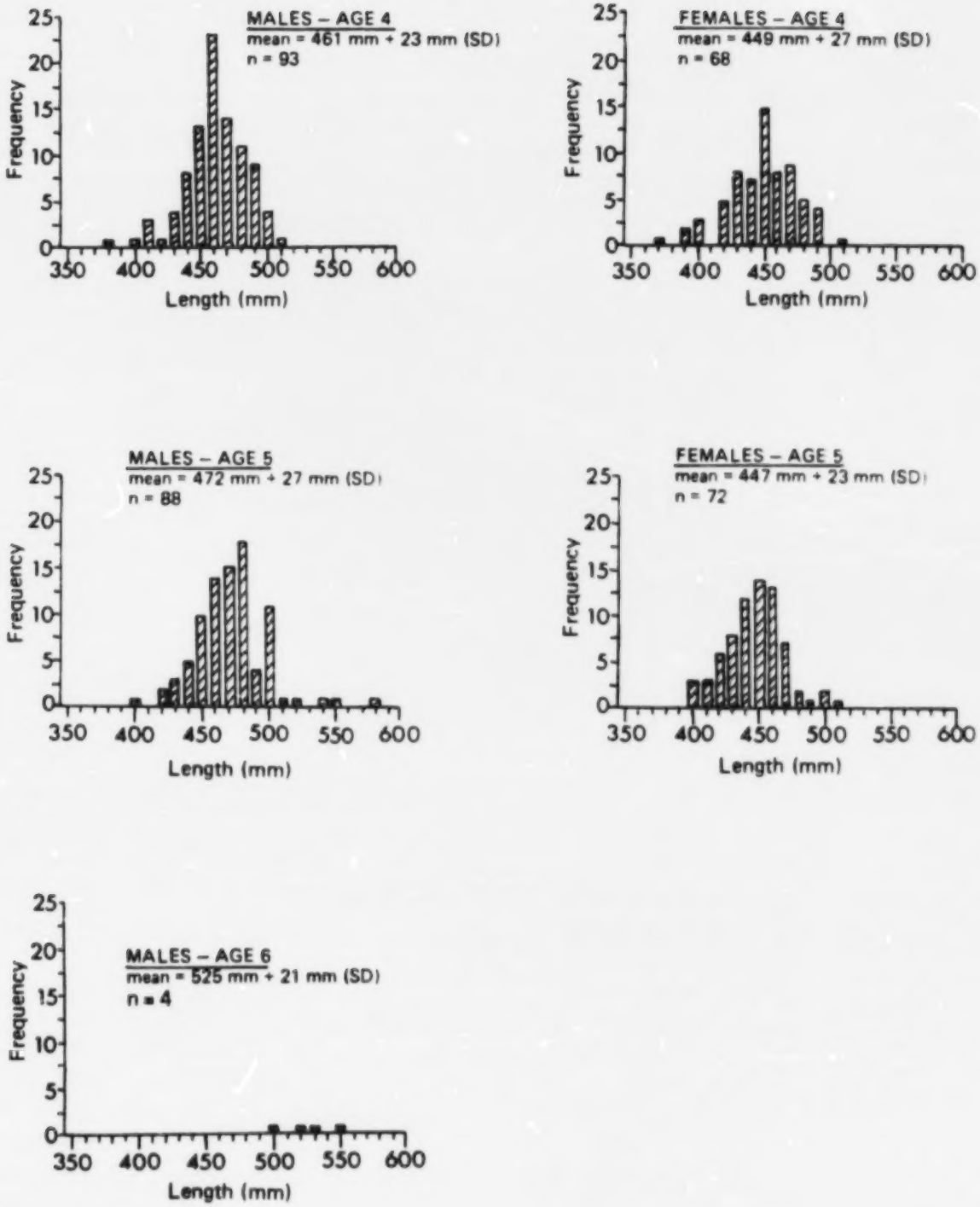

Fig. 10. Sockeye overall length frequencies by age and sex, Upper Dean Channel gillnet test fishery, July 1 - August 4, 1984.

Chum

An overall male to female sex ratio of 1.15:1 was observed for chum salmon during the test fishery. Weekly data indicated a higher percentage of females during the last three weeks of the run (August 5 - 25, 66% females), with 75% of the chum being female in the week of August 19 - 25 (Fig. 11, Table 7).

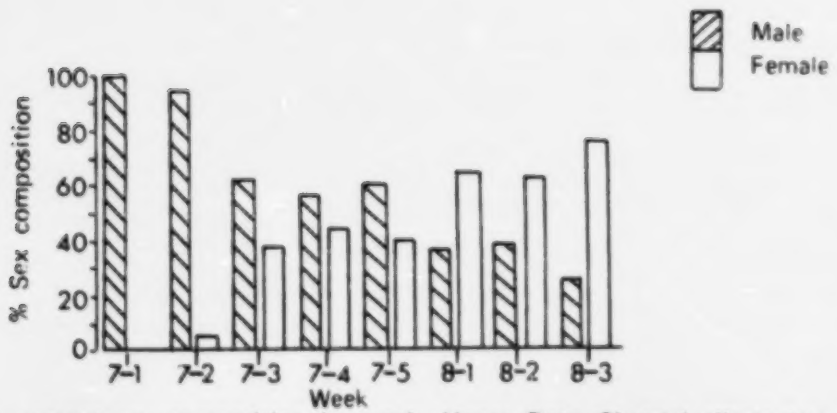

Fig. 11. Chum percent sex composition by week, Upper Dean Channel gillnet test fishery, July 1 - August 25, 1984.

Table 7. Chum sex composition by week, Upper Dean Channel gillnet test fishery, July 1 - August 25, 1984.

WEEK	TOTAL NO.	MALE NO.	MALE %	FEMALE NO.	FEMALE %
7-1	3	3	100	0	0
7-2	33	31	94	2	6
7-3	61	38	62	23	38
7-4	118	66	56	52	44
7-5	96	58	60	38	40
8-1	58	21	36	37	64
8-2	61	23	38	38	62
8-3	36	9	25	27	75
TOTAL	466	249	53%	217	47%

Chum age composition consisted of ages 3, 4 and 5 and was dominated by age 4 fish (58%) (Fig. 12, Table 8). Hypural length averaged 586 mm (range 460 mm - 700 mm) for females and 630 mm (range 490 mm - 760 mm) for males (Fig. 13, Table 9). Figure 14 shows the weekly mean hypural lengths by age and sex for chum salmon. Separation of age classes based on postorbital-hypural lengths

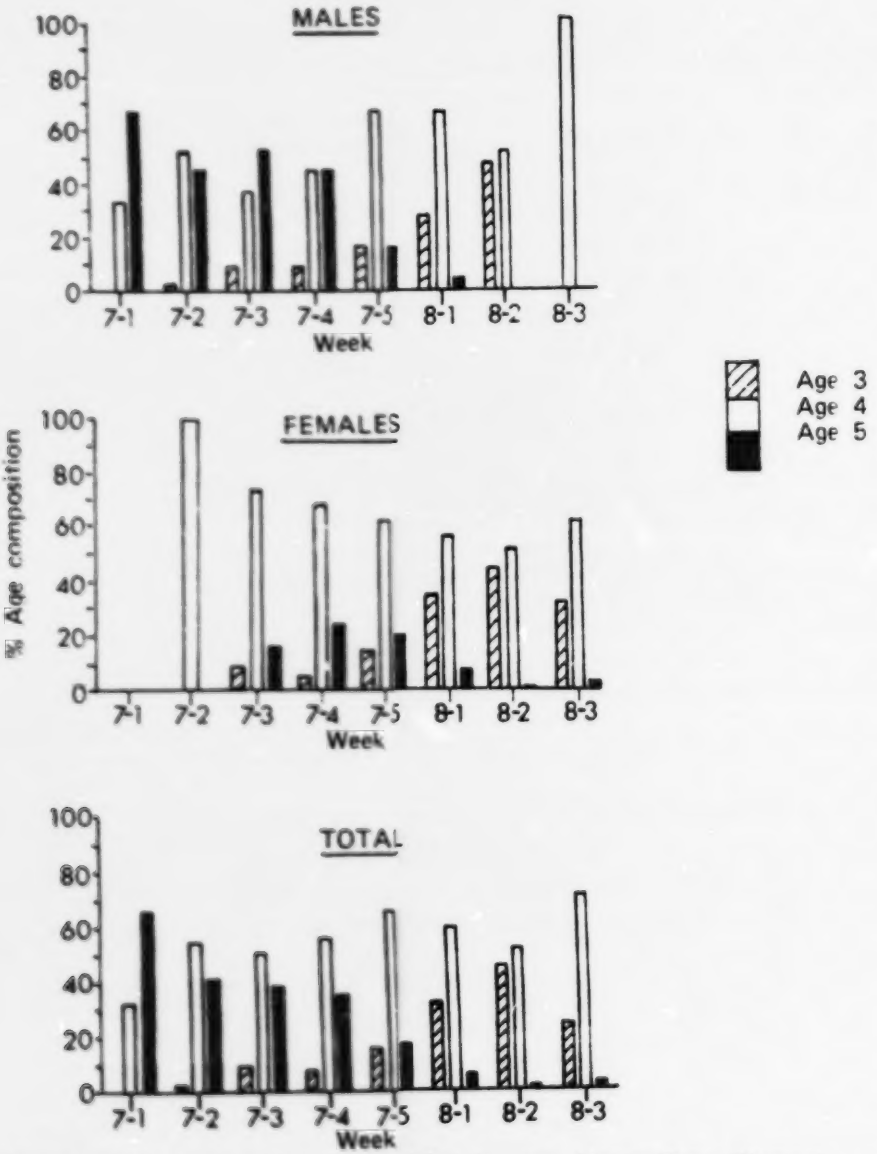

Fig. 12. Chum weekly percent age composition by sex, Upper Dean Channel gillnet test fishery, July 1 - August 25, 1984.

Table 8. Chum weekly percent age composition, Upper Dean Channel gillnet test fishery, July 1 - August 25, 1984.

WEEK	TOTAL NO.	AGE 3 NO.	AGE 3 %	AGE 4 NO.	AGE 4 %	AGE 5 NO.	AGE 5 %
7-1	3	0	0	1	33	2	67
7-2	33	1	3	18	55	14	42
7-3	61	6	10	31	51	24	39
7-4	118	9	8	66	56	43	36
7-5	96	16	17	63	66	17	18
8-1	58	19	33	35	60	4	7
8-2	61	28	46	32	52	1	2
8-3	36	9	25	26	72	1	3
TOTAL	466	88	19%	272	58%	106	23%

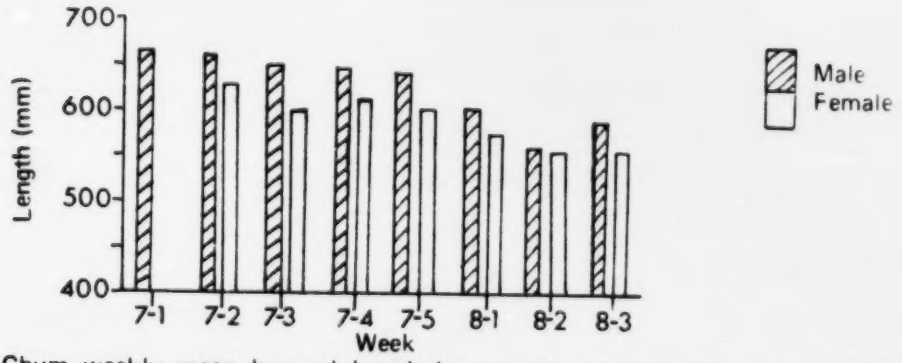

Fig. 13. Chum weekly mean hypural length by sex, Upper Dean Channel gillnet test fishery, July 1 - August 25, 1984 (ages combined).

Table 9. Chum weekly mean hypural length by sex, Upper Dean Channel gillnet test fishery, July 1 - August 25, 1984.

WEEK	TOTAL NO.	MALE MEAN (mm)	MALE RANGE (mm)	FEMALE MEAN (mm)	FEMALE RANGE (mm)	OVERALL MEAN (mm)
7-1	3	667	650-680			667
7-2	33	660	550-760	630	600-660	658
7-3	61	650	530-730	599	500-650	631
7-4	118	645	520-710	612	530-700	630
7-5	96	639	550-720	603	520-670	625
8-1	58	604	550-680	575	500-650	586
8-2	61	561	490-690	555	460-690	557
8-3	36	587	540-650	557	500-620	564
TOTAL	466	633	490-760	586	460-700	611

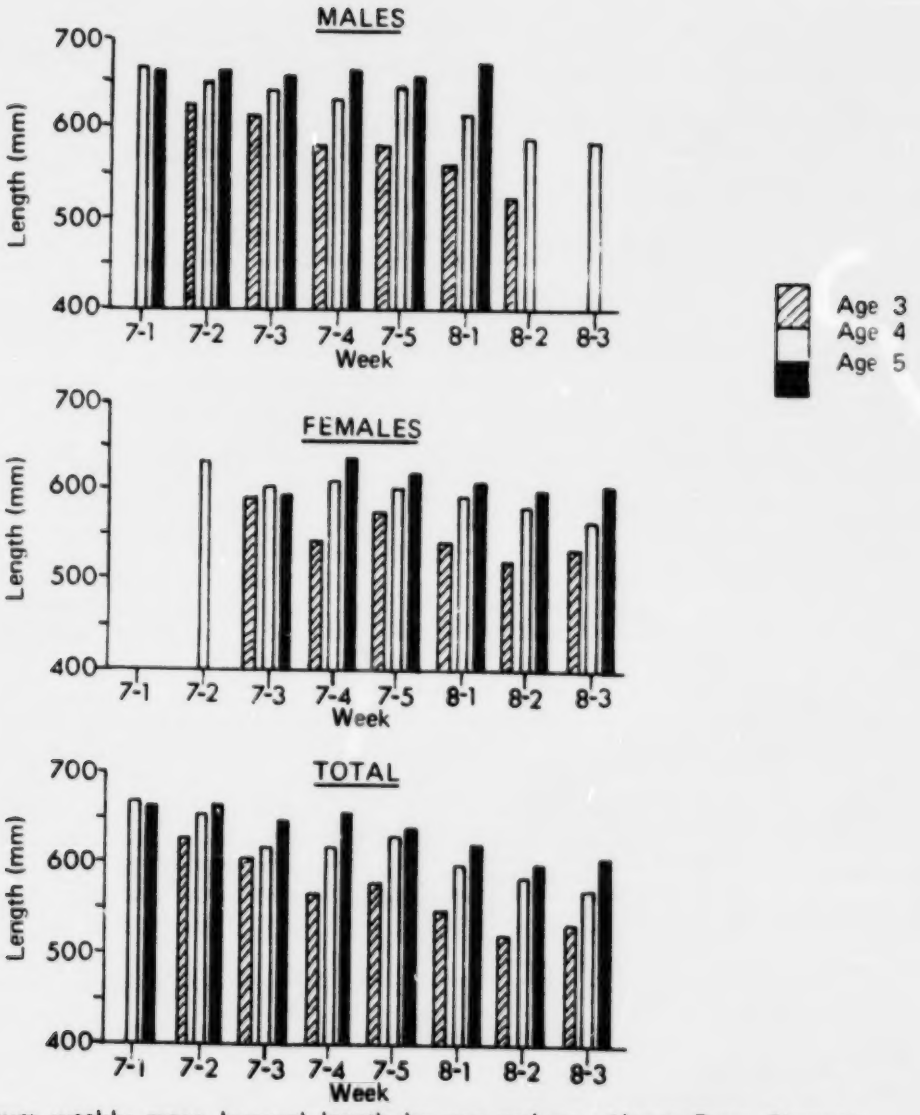

Fig. 14. Chum weekly mean hypural length by age and sex, Upper Dean Channel gillnet test fishery, July 1 - August 25, 1984.

was not possible for chum salmon due to similarity between age groups (Fig. 14, Tables 10 and 11). Overall percent age composition of chum salmon with respective mean hypural lengths and sex ratios are presented in Figure 15 and Table 11. Figure 16 shows the overall length frequencies by age and sex for chum salmon.

DISCUSSION

Terminal area test fishing is usually conducted in a situation where spawners are counted quantitatively using such methods as fence counts, electronic counters and mark-recovery programs. The test fishery is usually conducted under these circumstances because the time lag of up to several weeks which exists between the commercial fishery and the total spawner counts hinders the use of spawner counts for in-season fisheries management. The test fishery, then, provides an index of abundance which can be correlated to actual escapement in order forecast run strength and aid in fisheries management decisions prior to spawning. In the case of the Upper Dean Channel gillnet test fishery, quantitative spawner enumerations are not presently available, limiting the interpretation of the CPUE data in terms of real numbers of fish. Future test fisheries conducted concurrently with spawner enumerations during years with a wide range of escapement levels should clarify the relationship between CPUE data and spawner abundance. Further salmon abundance studies would be limited by the fact that the deep, glacial waters of the Kimsquit River provide very low visibility, making the feasibility of counting fences or mark-recapture studies questionable. Alternatively, an electronic counter in the river, cross-referenced by echo sounding transect surveys in Kimsquit Lake, might provide a feasible means of assessing and correlating test fishing CPUE with actual spawner counts.

Although test sets at the Manitoo Creek site generally yielded catches of sockeye moving in a uni-directional manner, considerable variation in directional movement was displayed by chum salmon at this site. The subsampled chum showed a 62.5% N.W. movement and a 37.5% S.E. movement, suggesting that some milling or holding occurred. Further investigation of a test site aimed at eliminating this masking of fish abundance through repeat catches and potential inflation of the CPUE value should be incorporated into the future test fishing in Upper Dean Channel.

Upon collection of two to three years of test fishing data in the Upper Dean Channel area, it will be possible to begin assessing the relative effects of factors such as tide, wind and sky conditions on the temporally localized abundance of salmon, irrespective of run timing. Webb (MS 1984), in his examination of chum salmon abundance in Cumshewa Inlet, Queen Charlotte Islands, found that time and tide did not significantly affect the abundance indicator (gillnet CPUE) of chum salmon during the spawning migration. Test fishing site, on the other hand, was a significant factor affecting catchability in that inlet. Further test fishing should continue to record climatological data associated with catch success.

Spawner characteristics were somewhat biased due to the size selectivity of the gillnet meshes (Ricker 1980; Todd and Larkin 1971). Stream sampling would provide less biased results.

Table 10. Chum length frequency distribution by age and sex, Upper Dean Channel gillnet test fishery, July 1 - August 25, 1984.

HYPURAL LENGTH (MM)	AGE 3		AGE 4		AGE 5	
	MALE	FEMALE	MALE	FEMALE	MALE	FEMALE
460		1				
470						
480						
490	1	1				
500	1	3		1		
510	1	3		1		
520	1	6		3		
530	5	9		4		
540	3	7	3	3		1
550	4	3	3	4		1
560	5	6	3	9		
570	4	5	4	16		1
580	1	3	7	10		
590	2	1	7	19		1
600	3	1	6	11		3
610		1	10	16	4	5
620	3		7	12	4	4
630	1		12	10	7	7
640	1		7	8	10	
650			22	6	7	4
660			12	2	5	
670	1		15	1	10	1
680			6		10	1
690	1		8	1	7	
700			1		3	1
710			1		4	
720					3	
730			1		1	
740						
750						
760					1	
TOTAL	38	50	135	137	76	30

Table 11. Chum overall age composition with respective mean hypural lengths and sex ratios, Upper Dean Channel gillnet test fishery, July 1- August 25, 1984.

	3 YRS OLD		4 YRS OLD		5 YRS OLD		TOTAL	
NO.	88		272		106		466	
% AT AGE	19%		58%		23%		100%	
MEAN LENGTH (mm)	553		614		652		611	
	MALE	FEMALE	MALE	FEMALE	MALE	FEMALE	MALE	FEMALE
SEX RATIO BY AGE	0.76:1		0.99:1		2.53:1		1.15:1	
NO.	38	50	135	137	76	30	249	217
% OF TOTAL	8	11	29	29	16	6	53	47
% M:F BY AGE	43	57	50	50	72	28	53	47
MEAN LENGTH BY AGE (mm)	569	541	633	595	664	621	633	586
STD. DEV. (mm)	45	30	40	36	32	34		

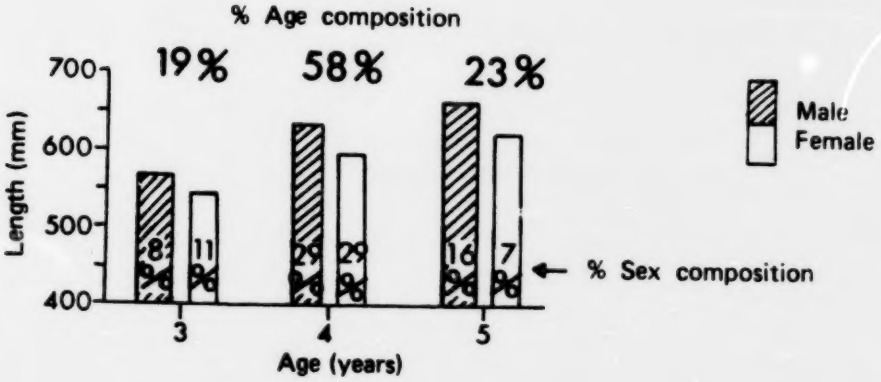

Fig. 15. Chum overall percent age composition with respective mean hypural lengths and sex ratios, Upper Dean Channel gillnet test fishery, July 1 - August 25, 1984.

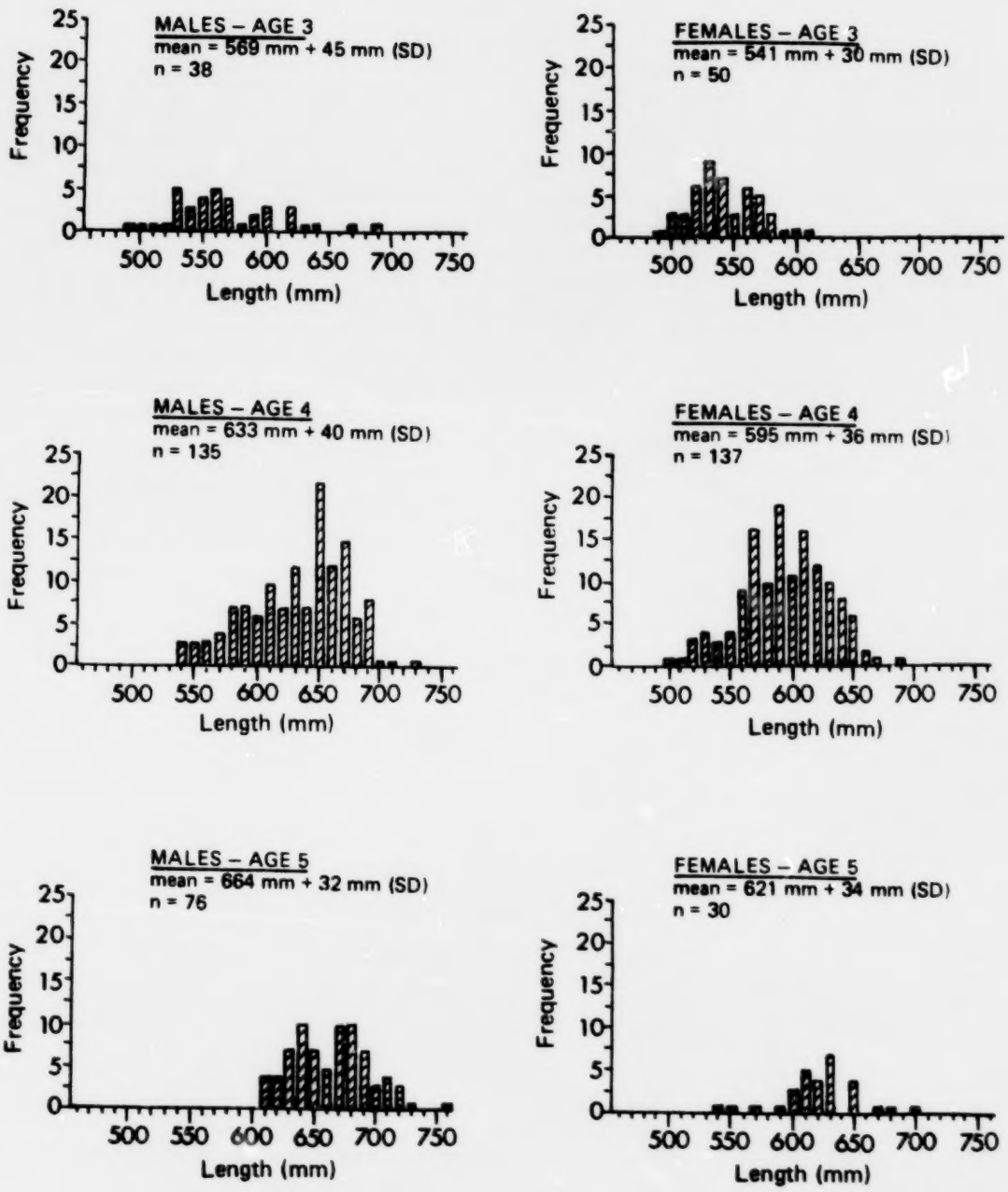

Fig. 16. Chum overall length frequencies by age and sex, Upper Dean Channel gillnet test fishery, July 1 - August 25, 1984.

ACKNOWLEDGEMENTS

The author would like to thank the following people for their assistance and participation in this study: Ed Wilson, skipper of the Lauren Lee, for his advice and service; Kevin O'Neil and Brian Penman, technicians responsible for data collection; fishery officers John Greenlee and Greg Savard for their continual support and coordinating efforts; the captain and crew of the fisheries vessels, Temple Rock and Gale Rock; and John and Joyce Robinson, fisheries patrolpersons aboard the Kailta for their hospitality and support. Ken Greene assisted with data compilation and production of figures and tables. Yvonne Yole was responsible for age analysis from scales. This study was funded through the Pacific Regional Planning group of the Department of Fisheries and Oceans. The terminal area nature of the test fishing study originated from Paul Sprout. Run timing, catch and escapement information was provided by Dave Peacock. Sandy Miller and the staff of the SEP Information/Processing Center typed the drafts and Alice Fedorenko drafted the final figures and prepared the manuscript for publication.

REFERENCES

Department Fisheries and Oceans. 1985. Pacific Region Salmon Resource Management Plan. Discussion Document. Vol. 1. Tech. Rep. Vancouver, B.C., 679 p.

Charles, A.T. and M.A. Henderson. 1985. Chum Salmon (Oncorhynchus keta) stock reconstructions for 1970-1982. Part I: Queen Charlotte Islands, North Coast and Central Coast, British Columbia. Can. MS. Rep. Fish. Aquat. Sci. 1814: 91 p.

McGivney, K. MS 1984. Relation between catch per unit effort and sockeye salmon (Oncorhynchus nerka) abundance in the Smith Inlet commercial fishery (unpublished).

Radford, D. 1984. Bella Coola (Area 8) fishery management planning workshop, April 3, 1984 (unpublished memorandum).

Ricker, W.E. 1980. Changes in the age and size of chum salmon (Oncorhynchus keta). Can. Tech. Rep. Fish. Aquat. Sci. 930: 99 p.

Starr, P.J., A.T. Charles, and M.A. Henderson. 1984. Reconstruction of British Columbia sockeye salmon (Oncorhynchus nerka) stocks: 1970-1982. Can. MS Rep. Fish. Aquat. Sci. 1780:123 p.

Todd, I.St.P., and P.A. Larkin. 1971. Gillnet selectivity on sockeye (Oncorhynchus nerka) and pink salmon (O.gorbuscha) of the Skeena River systems British Columbia. J. Fish. Res. Bd. Canada 28: 821-842.

Webb, T. M. MS 1984. An analysis of the chum salmon test fishing and tagging program in Cumshewa Inlet in 1982. ESSA Ltd. for Dept. of Fisheries and Oceans. 40 p. (unpublished).

Appendix 1. Bella Bella tide table, 1984. Test fishery sets were made during slack water tides.

BELLA BELLA (PST)

TIDE TABLES

1984

JULY-JUILLET										AUGUST-AOUT										SEPTEMBER-SEPTEMBRE									
Day	Time	Ht	ft	Ht	m	Jour	Heure	Ht	pi	Ht	m	Day	Time	Ht	ft	Ht	m	Jour	Heure	Ht	pi	Ht	m	Day	Time	Ht	ft	Ht	m	Jour	Heure	Ht	pi	Ht	m
1	0140	**16.9**		4.8		16	0225	**14.5**		4.4		1	0305	**16.2**		4.6		16	0315	**13.2**		4.0		1	0455	**12.8**		3.9		16	0415	**11.9**		3.6	
	0835	.6		2			0905	**2.3**		7			0930	**1.9**		.6			0925	**4.2**		1.3			1040	**5.6**		1.7			0950	**6.9**		2.1	
SU	1500	**13.3**		4.1		MO	1520	**13.1**		4.0		WE	1600	**14.8**		4.5		TH	1550	**13.9**		4.2		SA	1655	**14.9**		4.5		SU	1605	**13.8**		4.2	
DI	2030	**6.0**		1.8		LU	2100	**6.3**		1.9		ME	2215	**4.5**		1.4		JE	2200	**6.5**		1.7		SA	2350	**3.9**		1.2		DI	2250	**4.9**		1.5	
2	0225	**15.8**		4.8		17	0300	**13.9**		4.2		2	0405	**14.1**		4.3		17	0350	**12.4**		3.8		2	0555	**11.7**		3.6		17	0505	**11.2**		3.4	
	0920	**1.0**		.3			0930	**3.0**		.9			1025	**3.2**		1.0			0955	**6.1**		1.8			1130	**7.0**		2.1			1025	**7.7**		2.3	
MO	1550	**13.4**		4.1		TU	1605	**13.0**		4.0		TH	1650	**14.8**		4.5		FR	1620	**13.6**		4.1		SU	1750	**14.2**		4.3		MO	1650	**13.4**		4.1	
LU	2115	**6.9**		1.8		MA	2145	**6.4**		2.0		JE	2300	**4.5**		1.4		VE	2250	**6.6**		1.7		DI						LU	2350	**6.2**		1.8	
3	0320	**14.9**		4.5		18	0340	**13.1**		4.0		3	0505	**12.8**		3.9		18	0435	**11.6**		3.5		3	0100	**4.4**		1.3		18	0625	**10.7**		3.3	
	1005	**1.8**		.5			1005	**3.8**		1.2			1110	**4.5**		1.4			1030	**6.1**		1.9			0720	**11.1**		3.4			1125	**8.5**		2.6	
TU	1640	**13.6**		4.1		WE	1635	**13.0**		4.0		FR	1730	**14.7**		4.5		SA	1650	**13.4**		4.1		MO	1250	**8.0**		2.4		TU	1755	**13.1**		4.0	
MA	2215	**6.9**		1.8		ME	2240	**6.6**		2.0		VE						SA	2335	**6.7**		1.7		LU	1910	**13.6**		4.1		MA					
4	0410	**14.0**		4.3		19	0420	**12.3**		3.7		4	0015	**4.6**		1.4		19	0530	**10.6**		3.3		4	0220	**4.5**		1.4		19	0110	**5.1**		1.6	
	1045	**2.7**		.8			1050	**4.7**		1.4			0610	**11.7**		3.6			1100	**7.0**		2.1			0910	**11.2**		3.4			0810	**10.8**		3.3	
WE	1720	**13.8**		4.2		TH	1720	**13.0**		4.0		SA	1200	**5.9**		1.8		SU	1735	**13.2**		4.0		TU	1415	**8.3**		2.5		WE	1255	**8.8**		2.7	
ME	2330	**5.9**		1.8		JE	2340	**6.6**		2.0		SA	1840	**14.4**		4.4		DI						MA	2015	**13.4**		4.1		ME	1905	**13.1**		4.0	
5	0520	**12.9**		3.9		20	0515	**11.4**		3.5		5	0125	**4.5**		1.4		20	0040	**5.6**		1.7		5	0335	**4.2**		1.3		20	0230	**4.6**		1.4	
	1140	**3.8**		1.2			1120	**6.6**		1.7			0735	**11.0**		3.4			0655	**10.3**		3.1			1025	**11.8**		3.6			0925	**11.4**		3.5	
TH	1825	**14.0**		4.3		FR	1800	**13.0**		4.0		SU	1315	**7.0**		2.1		MO	1205	**7.8**		2.4		WE	1535	**8.0**		2.4		TH	1435	**8.3**		2.5	
JE						VE						DI	1930	**14.2**		4.3		LU	1835	**13.1**		4.0		ME	2135	**13.6**		4.1		JE	2035	**13.5**		4.1	
6	0040	**5.5**		1.7		21	0040	**6.4**		2.0		6	0245	**4.2**		1.3		21	0150	**5.2**		1.6		6	0435	**3.8**		1.2		21	0330	**3.8**		1.2	
	0630	**12.0**		3.7			0625	**10.7**		3.3			0905	**11.0**		3.4			0825	**10.3**		3.1			1100	**12.4**		3.8			1015	**12.3**		3.7	
FR	1235	**4.9**		1.5		SA	1200	**6.4**		2.0		MO	1420	**7.6**		2.3		TU	1325	**8.3**		2.5		TH	1630	**7.3**		2.2		FR	1540	**7.3**		2.2	
VE	1920	**14.3**		4.4		SA	1855	**13.1**		4.0		LU	2045	**14.1**		4.3		MA	1950	**13.2**		4.0		JE	2230	**13.9**		4.2		VE	2140	**14.3**		4.4	
7	0155	**4.9**		1.5		22	0135	**5.9**		1.8		7	0345	**3.6**		1.1		22	0310	**4.4**		1.3		7	0520	**3.3**		1.0		22	0435	**2.9**		.9	
	0750	**11.5**		3.5			0735	**10.3**		3.1			1025	**11.5**		3.5			0955	**10.9**		3.3			1145	**12.0**		3.9			1055	**13.3**		4.1	
SA	1340	**5.8**		1.8		SU	1310	**7.1**		2.2		TU	1535	**7.7**		2.3		WE	1455	**8.1**		2.5		FR	1715	**6.6**		2.0		SA	1635	**6.0**		1.8	
SA	2010	**14.5**		4.4		DI	1940	**13.2**		4.0		MA	2145	**14.3**		4.4		ME	2055	**13.7**		4.2		VE	2315	**14.3**		4.4		SA	2235	**15.2**		4.6	
8	0310	**4.1**		1.2		23	0245	**5.2**		1.6		8	0500	**3.0**		.9		23	0400	**3.4**		1.0		8	0555	**3.0**		.9		23	0520	**2.2**		.7	
	0915	**11.4**		3.5			0900	**10.4**		3.2			1120	**12.1**		3.7			1045	**11.7**		3.6			1215	**13.4**		4.1			1130	**14.5**		4.4	
SU	1450	**6.4**		2.0		MO	1405	**7.5**		2.3		WE	1640	**7.4**		2.3		TH	1555	**7.5**		2.3		SA	1800	**5.9**		1.8		SU	1725	**4.7**		1.4	
DI	2105	**14.8**		4.5		LU	2040	**13.6**		4.1		ME	2235	**14.5**		4.4		JE	2155	**14.5**		4.4		SA	2355	**14.6**		4.5		DI	2335	**15.9**		4.8	
9	0415	**3.2**		1.0		24	0340	**4.9**		1.3		9	0535	**2.5**		.8		24	0500	**2.4**		.7		9	0630	**2.9**		.9		24	0600	**1.9**		.6	
	1025	**11.7**		3.6			1005	**10.9**		3.3			1215	**12.5**		3.8			1130	**12.5**		3.8			1240	**13.8**		4.2			1210	**15.4**		4.7	
MO	1545	**6.8**		2.1		TU	1515	**7.6**		2.3		TH	1735	**6.9**		2.1		FR	1645	**6.6**		2.0		SU	1840	**5.2**		1.6		MO	1815	**3.4**		1.0	
LU	2205	**15.1**		4.6		MA	2125	**14.0**		4.3		JE	2325	**14.8**		4.5		VE	2250	**15.4**		4.7		DI						LU					
10	0500	**2.4**		.7		25	0440	**3.2**		1.0		10	0625	**2.1**		.6		25	0550	**1.5**		.5		10	0040	**14.7**		4.5		25	0025	**16.3**		5.0	
	1125	**12.2**		3.7			1110	**11.5**		3.5			1245	**12.9**		3.9			1200	**13.5**		4.1			0700	**3.0**		.9			0635	**2.0**		.6	
TU	1655	**6.8**		2.1		WE	1615	**7.3**		2.2		FR	1815	**6.4**		2.0		SA	1740	**5.5**		1.7		MO	1300	**14.2**		4.3		TU	1245	**16.3**		5.0	
MA	2245	**15.2**		4.6		ME	2225	**14.7**		4.5		VE						SA	2345	**16.1**		4.9		LU	1900	**4.8**		1.5		MA	1905	**2.3**		.7	
11	0555	**1.7**		.5		26	0515	**2.1**		.6		11	0005	**15.0**		4.6		26	0625	**.9**		.3		11	0100	**14.7**		4.5		26	0105	**16.2**		4.9	
	1215	**12.6**		3.8			1145	**12.2**		3.7			0655	**1.9**		.6			1250	**14.3**		4.4			0725	**3.2**		1.0			0725	**2.4**		.7	
WE	1735	**6.7**		2.0		TH	1715	**6.8**		2.1		SA	1315	**13.2**		4.0		SU	1830	**4.5**		1.4		TU	1330	**14.5**		4.4		WE	1330	**16.7**		5.1	
ME	2330	**15.4**		4.7		JE	2300	**15.4**		4.7		SA	1850	**5.9**		1.8		DI						MA	1940	**4.4**		1.3		ME	1955	**1.7**		.5	
12	0635	**1.4**		.4		27	0600	**1.1**		.3		12	0055	**15.1**		4.6		27	0040	**16.6**		5.1		12	0145	**14.3**		4.4		27	0155	**15.7**		4.8	
	1300	**12.9**		3.9			1240	**12.8**		3.9			0730	**2.0**		.6			0700	**.7**		.2			0750	**3.7**		1.1			0800	**3.3**		1.0	
TH	1820	**6.6**		2.0		FR	1750	**6.2**		1.9		SU	1350	**13.5**		4.1		MO	1320	**15.0**		4.6		WE	1405	**14.8**		4.5		TH	1400	**16.9**		5.2	
JE						VE	2355	**16.0**		4.9		DI	1930	**5.6**		1.7		LU	1920	**3.7**		1.1		ME	2015	**4.2**		1.3		JE	2030	**1.8**		.5	
13	0025	**15.4**		4.7		28	0645	**.6**		.2		13	0125	**14.9**		4.5		28	0125	**16.6**		5.1		13	0220	**13.9**		4.2		28	0255	**15.0**		4.6	
	0710	**1.3**		.4			1310	**13.4**		4.1			0800	**2.2**		.7			0755	**1.0**		.3			0825	**4.3**		1.3			0835	**4.4**		1.3	
FR	1330	**13.1**		4.0		SA	1840	**6.6**		1.7		MO	1415	**13.6**		4.1		TU	1405	**15.6**		4.8		TH	1430	**14.6**		4.5		FR	1455	**16.5**		5.0	
VE	1910	**6.3**		1.9		SA						LU	2010	**6.4**		1.6		MA	2010	**3.0**		.9		JE	2055	**4.2**		1.3		VE	2120	**2.0**		.6	
14	0105	**15.2**		4.6		29	0045	**16.4**		5.0		14	0205	**14.5**		4.4		29	0200	**16.1**		4.9		14	0250	**13.3**		4.1		29	0335	**13.9**		4.2	
	0745	**1.3**		.4			0735	**.3**		.1			0830	**2.7**		.8			0825	**1.8**		.5			0855	**5.1**		1.6			0915	**5.0**		1.7	
SA	1410	**13.1**		4.0		SU	1350	**13.9**		4.2		TU	1450	**13.8**		4.2		WE	1440	**15.9**		4.8		FR	1455	**14.4**		4.4		SA	1535	**15.8**		4.8	
SA	1950	**6.3**		1.9		DI	1930	**5.0**		1.5		MA	2040	**5.3**		1.6		ME	2050	**2.9**		.9		VE	2120	**4.4**		1.3		SA	2220	**2.7**		.8	
15	0140	**14.9**		4.5		30	0135	**16.4**		5.0		15	0235	**14.0**		4.3		30	0300	**15.2**		4.6		15	0335	**12.8**		3.8		30	0430	**12.9**		3.9	
	0825	**1.8**		.5			0810	**.5**		.2			0900	**3.4**		1.0			0900	**2.8**		.9			0915	**6.0**		1.8			1005	**6.8**		2.1	
SU	1500	**13.1**		4.0		MO	1440	**14.4**		4.4		WE	1515	**13.8**		4.2		TH	1515	**15.9**		4.8		SA	1525	**14.2**		4.3		SU	1625	**14.9**		4.5	
DI	2025	**6.3**		1.9		LU	2025	**4.8**		1.4		ME	2125	**5.3**		1.6		JE	2150	**3.0**		.9		SA	2210	**4.6**		1.4		DI	2320	**3.7**		1.1	
						31	0225	**16.0**		4.9								31	0345	**14.0**		4.3													
							0850	**1.0**		.3									0955	**4.2**		1.3													
						TU	1515	**14.6**		4.5								FR	1615	**15.5**		4.7													
						MA	2105	**4.5**		1.4								VE	2245	**3.4**		1.0													

Appendix 2. Gillnet and vessel specifications, Upper Dean Channel test fishery, 1984.

Gillnet Vessel: Lauren Lee

Length	10.5 m (34.5 ft)
Estimated o.a.l.	16.67 m
Gross Capacity	25.47 m^3
Net Capacity	17.81 m^3
Engine	90 H.P. Diesel
Construction	Wooden

Gillnet Specifications:

Net #1 - 11.75 cm (4 5/8 in) mesh, 23 gauge nylon, UR 22C colour, 60 meshes deep, 200 fm long, 500 fm web, 82 kg (180 lb) lead line.

Net #2 - 11.11 cm (4 3/8 in) mesh, 18 gauge nylon, 60 meshes deep, 200 fm long, 550 fm web, 82 kg (180 lb) lead line.

Net #3 - 16.51 cm (6 1/2 in) mesh, 33 gauge nylon, UR-32 colour, 200 fm long, 500 fm web, 104 kg (230 lb) lead line.

Net #4 - 15.56 cm (6 1/8 in) mesh).

Appendix 3. Species catch, set time, duration, location and climatological data, Upper Dean Channel gillnet test fishery, 1984.

CALENDAR DATE	SET NUMBER	STATION[a] NUMBER	TIME SET (MEDIAN)	FISH TIME (MIN)	T.F.[b] DATE	TIDE[c]	NET[d] (CODED)	WATER TEMP (C)	SEA[e] (CODED)	WIND[f] DIR (CODED)	SKY[g] (CODED)	SEALS	SPECIES CATCH							
													SOCKEYE	COHO	PINK	CHUM	CHINOOK	JACK CHINOOK	STEEL-HEAD	SALMON[h] SP.
JUNE 26	1	1	513	57	JUNE 26	LL	1		1	0	5	2	1						1	
JUNE 26	2	2	1116	99	JUNE 26	LH	1		2	6	4								5	
JUNE 26	3	2	1712	72	JUNE 27	HL	1		2	7	5	1			2		1	1	3	
JUNE 26	4	1	2223	66	JUNE 27	HH	1		2	7	4	1	3				1		2	
JULY 1	5	1	215	64	JULY 1	HH	2		1	7	4	1	5		3			1		
JULY 1	6	1	858	70	JULY 1	LL	2		2	7	4	1	1			1			2	
JULY 1	7	2	1527	72	JULY 1	LH	2		2	7	5		1		7				1	
JULY 1	8	2	2058	78	JULY 2	HL	2		2	7	4		5	1	4				3	
JULY 2	9	3	253	69	JULY 2	HH	2		2	7	4				1					
JULY 2	10	3	951	67	JULY 2	LL	2		1	7	5	1			4	1				
JULY 4	11	1	433	72	JULY 4	HH	2		1	7	5	1	14		55	1	1	3	3	4
JULY 4	12	2	1113	70	JULY 4	LL	2	13	1	9	5	2							2	1
JULY 4	13	4	1717	101	JULY 4	LH	2		1	8	5	1								1
JULY 4	14	1	2359	69	JULY 5	HL	2		1	9	5	1			2				1	2
JULY 8	15	2	343	67	JULY 8	LL	2		1	7	4	1			2					2
JULY 8	16	2	943	72	JULY 8	LH	2		1	7	5	2	9		9	1	1	2		4
JULY 8	17	1	1517	75	JULY 8	HL	2	13	2	7	2	1	12		11	2				3
JULY 8	18	1	2133	72	JULY 9	HH	2		2	7	5	2	6		1	1			1	5
JULY 9	19	1	444	72	JULY 9	LL	2		1	7	4	2	7		1				1	4
JULY 9	20	1	1047	95	JULY 9	LH	2		2	9	4	2	62		36	5	1		13	8
JULY 9	21	2	1609	75	JULY 9	HL	2	14	6	7	4		7		7	2				1
JULY 9	22	2	2233	67	JULY 10	HH	2		2	7	4				1					2
JULY 14	23	1	133	80	JULY 14	HH	2		1	2	1	1	30		38	4		1		12
JULY 14	24	1	818	81	JULY 14	LL	2		1	3	1	4	47		9	10			3	5
JULY 14	25	1	1446	69	JULY 14	LH	2	14	1	3	4	3	21		3	5				
JULY 14	26	1	2023	86	JULY 15	HL	2		1	2	4	4	54		61	3			2	12
JULY 15	27	1	215	71	JULY 15	HH	2		1	2	1	>10	5		6				1	18
JULY 15	28	1	857	98	JULY 15	LL	2		1	3	1	>10	63		47	4				16
JULY 15	29	1	1551	82	JULY 15	LH	2	16	1	2	1	1	30		3					3
JULY 15	30	1	2058	72	JULY 16	HL	2		1	2	1	3	45		7	1		1		8
JULY 19	31	1	453	90	JULY 19	LH	2		2	4	4		94		25	2			2	
JULY 19	32	1	1123	69	JULY 19	LL	2		1	4	5	1	11		11					2
JULY 19	33	1	1752	70	JULY 20	HH	2	13	1	7	4	1	25		16	10				
JULY 21	34	1	113	105	JULY 21	LL	2		1	0	1	1	77	1	106	12		1		7
JULY 21	35	1	658	71	JULY 21	LH	2		1	8	3	1	15	1	1	8				2

Appendix 3 (cont'd).

CALENDAR DATE	SET NUMBER	STATION[a] NUMBER	TIME SET (MEDIAN)	FISH TIME (MIN)	T.F.[b] DATE	TIDE[c]	NET[d] (CODED)	WATER TEMP (C)	SEA[e] (CODED)	WIND[f] DIR (CODED)	SKY[g] (CODED)	SEALS	SPECIES CATCH							
													SOCKEYE	COHO	PINK	CHUM	CHINOOK	JACK CHINOOK	STEEL-HEAD	SALMON[h] SP.
JULY 21	36	1	1234	66	JULY 21	LL	3	15	1	0	2	2	1		1	19			3	1
JULY 21	37	1	1928	65	JULY 22	HH	3		2	7	1	2	2		1	6			2	
JULY 22	38	1	208	68	JULY 22	LL	3		1	0	1	2	8		2	9	1			3
JULY 22	39	1	807	82	JULY 22	LH	3		2	8	1	1	18		1	50			3	2
JULY 22	40	1	1543	73	JULY 22	HL	2	17	1	7	1	1	26		14	6				2
JULY 23	41	1	318	80	JULY 23	LL	2		1	0	1	2	15		49	13		1		12
JULY 23	42	1	933	68	JULY 23	LH	2		1	0	1	1	9		3	14				
JULY 23	43	1	1437	71	JULY 23	HL	2	19	1	0	1	1	1		4	3				
JULY 23	44	1	2112	66	JULY 24	HH	3		1	0	1	2	4			8				
JULY 26	45	1	548	64	JULY 26	LL	3		1	0	4	1	1			21				
JULY 26	46	1	1218	80	JULY 26	LH	3		1	0	4	2	1			10			2	
JULY 26	47	1	1748	78	JULY 27	HL	3	16	1	0	5	2	1		1	8				
JULY 26	48	1	2333	90	JULY 27	HH	2		1	0	5	2	6		35	3			1	5
JULY 28	49	1	28	79	JULY 28	HH	2		1	0	1		17		23	3	1			8
JULY 28	50	1	718	71	JULY 28	LL	2		1	0	3	2	8		19	11			1	1
JULY 28	51	1	1343	70	JULY 28	LH	3	19	2	7	1		11			18				
JULY 28	52	1	1913	65	JULY 29	HL	3		2	0	2		1			7				
JULY 29	53	1	118	72	JULY 29	HH	3		2	8	1				1	3	1		1	3
JULY 29	54	1	808	73	JULY 29	LL	3		1	0	2	4				16			3	3
JULY 29	55	1	1423	77	JULY 29	LH	2	16	1	7	1		34		30	8				6
JULY 29	56	1	2003	83	JULY 30	HL	2		1	0	1	3	53		58	11				
AUG 1	57	1	339	67	AUG 1	HH	2		1	0	1	>10	4		3	2			1	7
AUG 1	58	1	1005	66	AUG 1	LL	2		1	0	4		5		5	9				
AUG 1	59	1	1633	71	AUG 1	LH	3	16	2	7	3					38				
AUG 1	60	1	2248	68	AUG 2	HL	3		2	6	4					6			3	
AUG 2	61	1	438	68	AUG 2	LH	3		1	6	1					16				
AUG 2	62	1	1058	68	AUG 2	HL	3		1	0	1		2		2	21				
AUG 8	63	1	533	75	AUG 8	LL	3		1	0	4	2				10				
AUG 8	64	1	1159	71	AUG 8	LH	3		1	0	5					6				
AUG 8	65	1	1714	79	AUG 8	HL	3	15	2	7	5	1		2	1	49			4	5
AUG 8	66	1	2314	74	AUG 8	HH	3		2	7	4			4		34				
AUG 9	67	1	613	60	AUG 9	LL	3		1	3	3	2			1	20			1	2
AUG 9	68	1	1253	67	AUG 9	LH	3	15	1	3	2			2	2	10			1	1
AUG 9	69	1	1814	69	AUG 9	HL	3		1	0	2	3	1	1		22			1	
AUG 10	70	1	3	77	AUG 10	HH	3		2	3	2				2	25				2

Appendix 3 (cont'd).

CALENDAR DATE	SET NUMBER	STATION[a] NUMBER	TIME SET (MEDIAN)	FISH TIME (MIN)	T.F.[b] DATE	TIDE[c]	NET[d] (CODED)	WATER TEMP (C)	SEA[e] (CODED)	WIND[f] DIR (CODED)	SKY[g] (CODED)	SEALS	SPECIES CATCH							
													SOCKEYE	COHO	PINK	CHUM	CHINOOK	JACK CHINOOK	STEEL-HEAD	SALMON[h] SP.
AUG 15	71	1	308	72	AUG 15	HH	4		1	0	3	1				26				5
AUG 15	72	1	938	80	AUG 15	LL	4		2	7	3	2				62				3
AUG 15	73	1	1553	67	AUG 15	LH	4	14	2	3	5	2				9				
AUG 15	74	1	2203	67	AUG 16	HL	4		1	0	2				1	15	1			1
AUG 16	75	1	348	70	AUG 16	LH	4		1	0	2				3	21				4
AUG 16	76	1	953	72	AUG 16	LL	4		1	9	4	3			2	17				
AUG 16	77	1	1624	72	AUG 16	HH	4	15	2	3	4			2		28			2	
AUG 16	78	1	2253	67	AUG 17	HL	4		1	0	2	2				21	1		1	3
AUG 21	79	1	225	75	AUG 21	LL	4		1	0	1			4	2	25			1	6
AUG 21	80	1	858	82	AUG 21	LH	4		1	9	1	1		2	1	47				5
AUG 21	81	1	1358	70	AUG 21	HL	4	15	1	3	2	2			1	24			1	
AUG 21	82	1	2025	70	AUG 22	HH	4		1	0	2			2	1	11			1	
AUG 22	83	1	344	72	AUG 22	LL	4		1	0	3	1			1	18			1	4
AUG 22	84	1	1028	70	AUG 22	LH	4		2	7	5	1		2		34			1	1
AUG 22	85	1	1529	64	AUG 22	HL	4	14	2	7	4				1	7			1	
TOTAL												95	877	24	748	951	10	11	82	217

[a] STATION NUMBER: 1 = INSIDE POINT 2.2 KM SOUTH OF MANITOO CREEK
2 = 1.6 KM NORTH OF SMALLOP CREEK
3 = 0.6 KM SOUTH OF RAPHOE POINT
4 = POINT IMMEDIATELY NORTHWEST OF HUMPBACK CREEK

[b] TESTING FISH DATE: DATA STARTS AT 1701 HRS ON DAY "T" AND ENDS AT 1700 ON DAY "T+1"

[c] TIDE: SLACK WATER TIDES; 1 HOUR LATER THAN TIDES LISTED ON HELLA BELLA TIDETABLE

[d] NET: 1 = 4 5/8" MESH, 500 FM WEB, 200 FM LONG
2 = 4 3/8" MESH, 500 FM WEB, 200 FM LONG
3 = 6 1/2" MESH, 500 FM WEB, 200 FM LONG
4 = 6 1/8" MESH

[e] SEA: 1 = CALM
2 = 0.3 M - 1.5 M SWELLS
3 = 1.5 M - 7.5 M SWELLS

[f] WIND DIRECTION: 1 = NORTH
2 = NORTHEAST
3 = EAST
4 = SOUTHEAST
5 = SOUTH
6 = SOUTHWEST
7 = WEST
0 = NO WIND

[g] SKY: 1 = CLEAR
2 = 1% - 30% CLOUD COVER
3 = 30% - 60% CLOUD COVER
4 = 60% - 100% CLOUD COVER
5 = RAIN

[h] SALMON SP. = UNIDENTIFIED SALMONID DUE TO SEAL BITES